STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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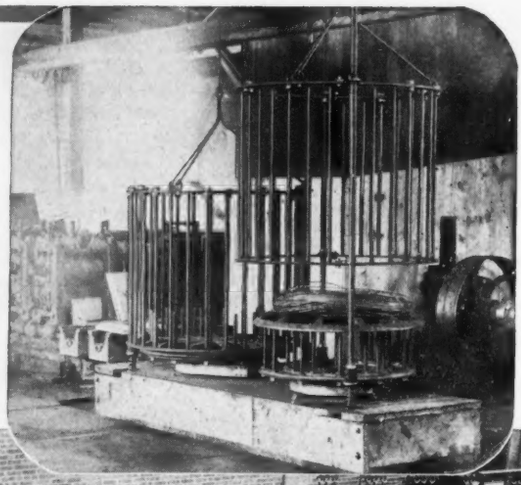

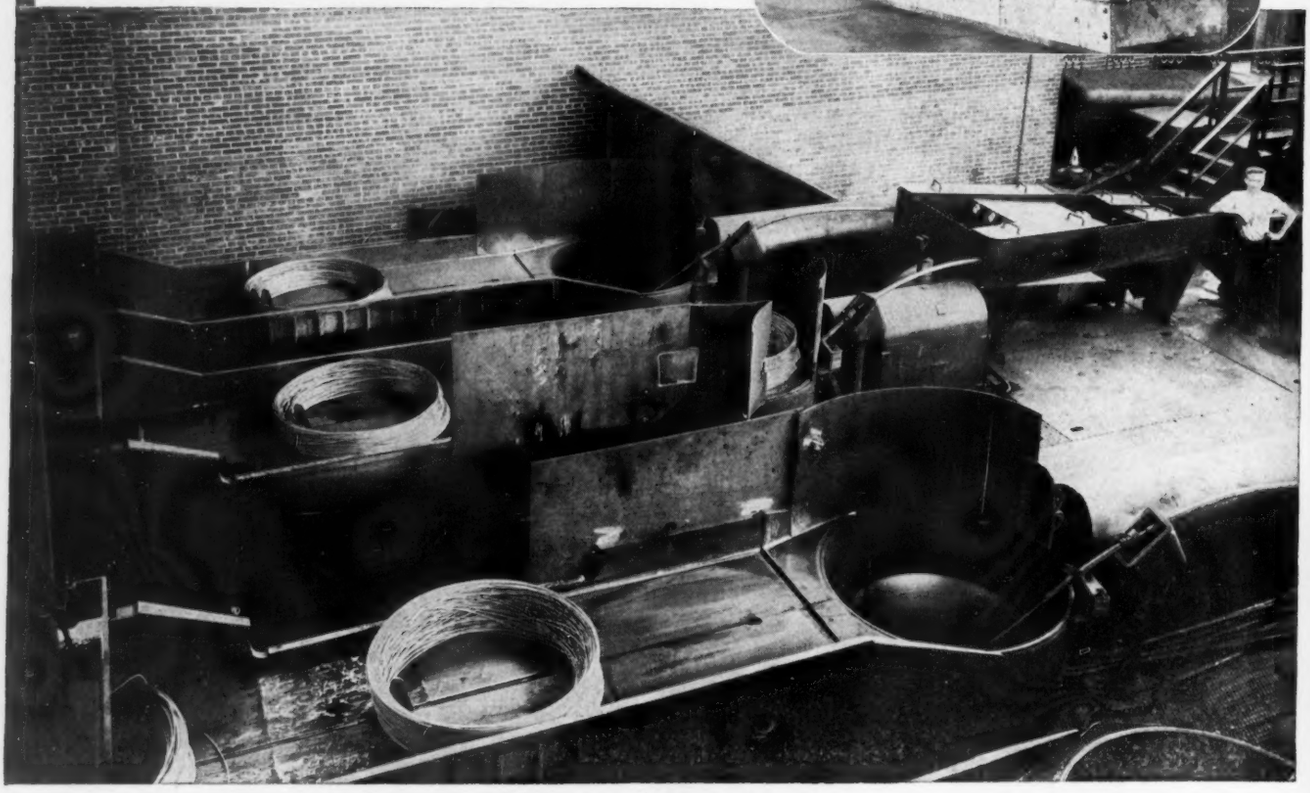

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As the Editor Views the News

RECENT developments in wage adjustments indicate a strong tendency toward the elimination of certain well established differentials. The traditional margins between the rates for identical work in the North and South and in urban and rural sections are in danger of being narrowed or destroyed. It is doubtful whether the persons who have been chiefly responsible for the introduction of the uniform wage scales which threaten these differentials realize the economic consequences of their action. If the transition to uniformity is forced too abruptly, serious hardships will be imposed upon industrial concerns in certain localities.

• • •

Wages and Competition

Members of the blast furnace and raw materials committee of A. I. M. E. meeting in Birmingham (p. 29), were quick to sense one inevitable result of the elimination of wage differentials. Equalizing wages will tend to alter the competitive position of Southern pig iron in Northern markets. Similarly industrial employers in rural communities, who have enjoyed certain advantages over competitors situated in cities because of lower wage rates, will be confronted with new problems if the differentials are removed. Before going too far in unifying wages, it will be well to know whether or not it will work against a desirable degree of decentralization of industry.

• • •

Perpetuating Unemployment

Persons who delight in criticizing industry for its alleged failure to extend employment will be confounded by the figures compiled by the American Iron and Steel institute (p. 27) which show that the steel industry employed 556,000 persons in February, or 98,000 more than in 1929. Total payrolls in February, 1936, amounted to $74,278,000 compared with $50,250,000 in February of the preceding year, an increase of 48 per cent. This showing, together with those of certain other divisions of the durable goods industry, raises the question as to whether the President is justified in intimating that emphasis in relief work should be shifted from the heavy industries to the consumer goods industries. To continue to think up rake and shovel projects to occupy the unemployed (p. 47) instead of encouraging private employment through the government use of materials is to perpetuate unnecessarily the army of unemployed.

• • •

Progress in Metalworking

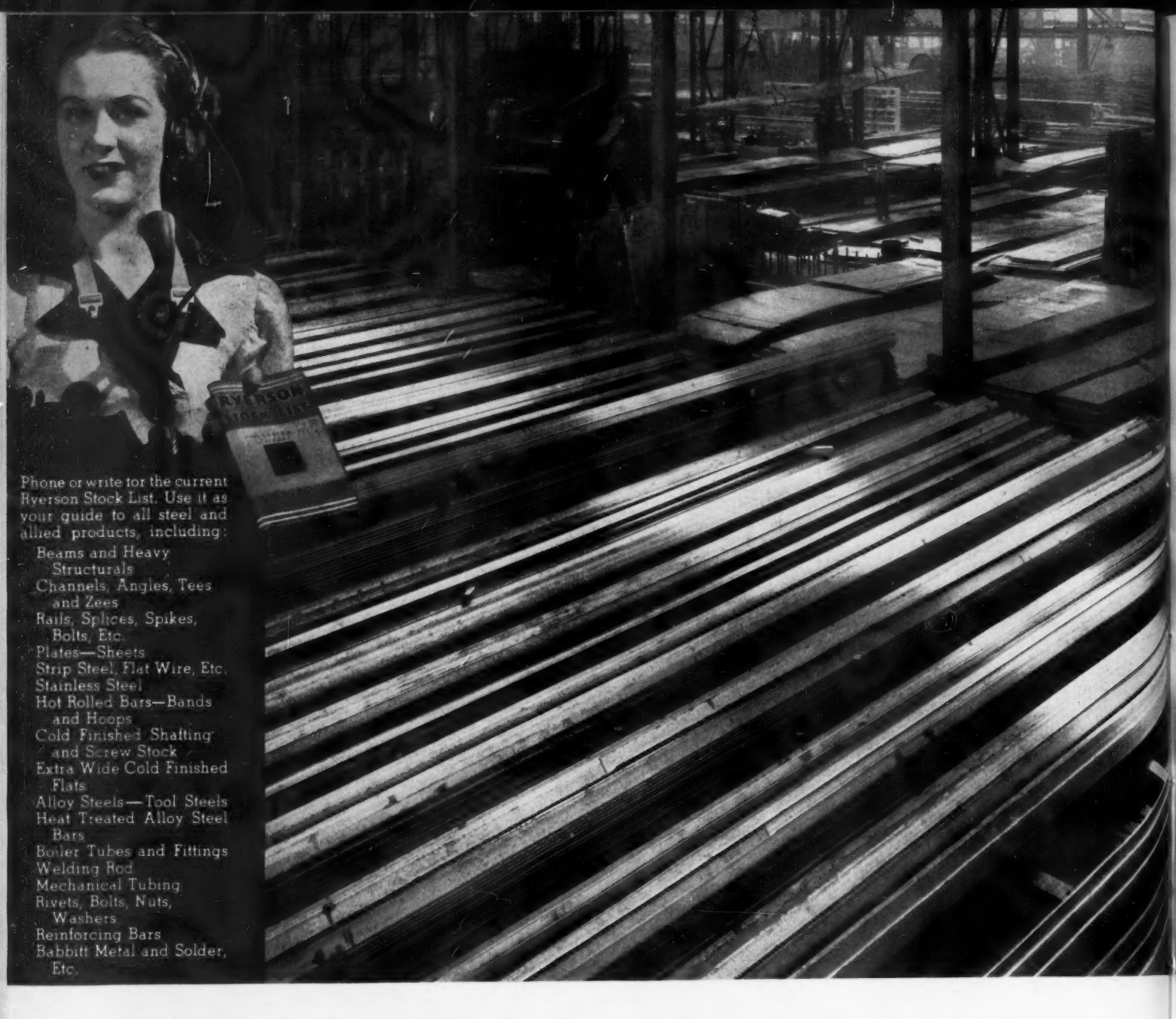
STEEL'S engineering pages this week are replete with a wealth of information on important new developments in the metalworking industries. A manufacturer of material handling equipment has introduced (p. 57) a type of roller conveyor which is mounted resiliently to absorb shock—an obvious improvement over orthodox design. . . . An Ohio company, which has adopted straight-line production methods in manufacturing bicycles (p. 74), employs interesting methods to achieve attractive finishes for its product economically. . . . The familiar justification for insulating the refractory linings of furnaces is fuel economy, but the author of an exhaustive study of the subject (p. 89) lists six other good reasons and presents important test data on various insulating materials.

• • •

Testing for Performance

No manufacturer or producer can know too much about the quality and performance of his own products. Many companies spend large sums annually in attempting to learn accurately the ultimate and safe loads to which their equipment may be subjected. Indicative of the care exercised in obtaining data of this kind is the action of a roller bearing manufacturer (p. 50) in recently expanding its research and testing laboratory to afford broader facilities for studying the performance of bearings and testing them under a variety of conditions. Of special interest are the facilities for the photoelastic investigation of stresses. . . . Steelmakers will want to study the detailed log (p. 64) of a heat of basic open-hearth steel, which appears in the current installment of a 4-part article on the basic process.

E. L. Shaner



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Steel Employment, 556,000, at New Peak; Hourly, Weekly Wage Averages Up

EMPLOYMENT in the iron and steel industry in February reached an all-time peak of 556,000, or 98,000 more than in the same month of 1929. The February level was 23 per cent above the 453,000 employed in February a year ago.

Payrolls in February, which amounted to $74,278,000, were nearly half again as large as those in February last year, $50,250,000.

Average earnings for 503,000 wage-earning employes in February were substantially higher in the month last year.

Hourly earnings averaged 72.8 cents, while the average weekly wage amounted to nearly $31, as wage earners worked an average of 42½ hours per week.

The February payrolls records do not reflect generally the wage increase which became effective March 16, and which raised hourly earnings to an estimated 83½ cents, not considering time and a half for overtime beyond 40 hours a week.

The American Iron and Steel institute which issued the foregoing figures, also made a comparison last week between American steel workers wages and those received in foreign countries.

Far Above European Rates

American workers, it stated, received an average of 67 cents an hour in 1936, compared with 28 cents average for workers in eight foreign steel producing countries. Figures used for foreign countries were chiefly from the international labor office, and calculations were made at prevailing rates of exchange.

After the 10 per cent wage increase last November steel workers here earned an average of 73 cents an hour, or 160 per cent more than the foreign average. Latest increase in March is estimated to have raised hourly earnings of American workers to 83½ cents, or nearly 200 per cent above foreign average.

Americans' hourly wage rate ranged from 81 per cent to 740 per cent above those in the eight foreign countries. After the March increase, hourly earnings ranged from 125 per cent to 950 above foreign levels.

Foreign work weeks are longer than in the United States and spread of total weekly wages is less. The institute points out that figures have not been adjusted for changes which may have occurred since the period covered by available data, generally last quarter of 1935 or in the year 1936.

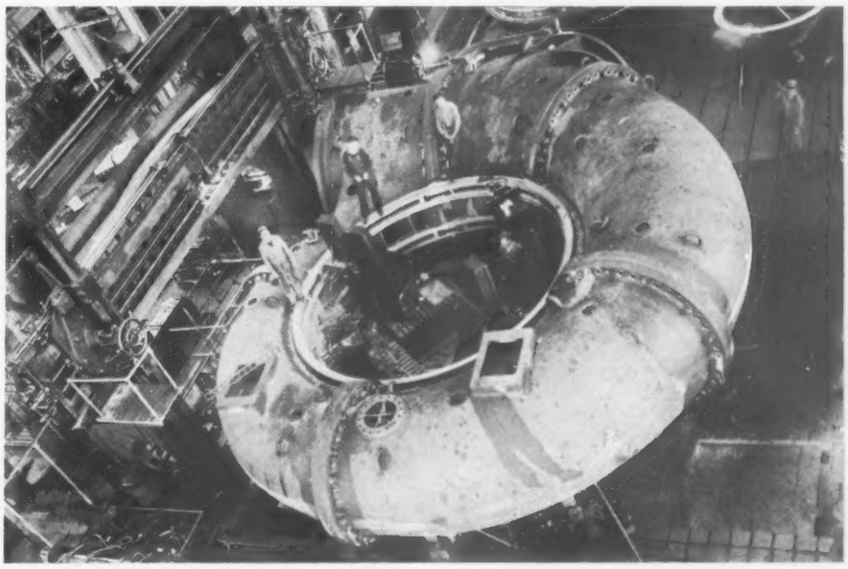
Hourly wages of foreign workers ranged from 8 cents for Japanese to 37 cents in French mills. Workers in Great Britain received 34½ cents, German and Swedish workers 29 cents, Polish 22½ cents, Italian 21 cents and Belgian 16 cents.

CLAIM AGREEMENTS WITH 50 METALWORKING COMPANIES

Fifty metalworking companies have signed contracts with CIO since March 1, according to lists issued by the CIO. These do not include the five United States Steel Corp. subsidiaries. Moreover, according to the CIO, negotiations are now under way with at least a dozen additional companies in the metalworking industry.

John L. Lewis, head of the CIO, asserted in Pittsburgh last Thursday that a "CIO contract is adequate protection for any employer against

Machining on a Gigantic Scale



THE boring mill is machining the inner bore of an assembled casing for a Boulder Dam turbine. Housings of the mill have been withdrawn to the limit of their supporting rails to allow the assembly to be mounted centrally over the boring mill table. Cutting tools are mounted on the revolving table. Photo, courtesy Baldwin-Southwark Corp., Philadelphia

sitdowns, laydowns or any other kind of strike."

"Our contracts provide a way to discipline workers who violate an agreement," said Lewis after a short conference with union leaders in the drive to organize the steel industry.

"The CIO stands for punctilious observance of contracts. Where strikes are illegally called, those responsible will be summarily dealt with by discharge of the men responsible and their expulsion from the union."

In the meantime, a sitdown strike was in progress at the plant of the Mesta Machine Co., West Homestead, Pa., affecting approximately 1500 men on the day shift. The CIO said apparently the men were unaware that the company had agreed to meet with union leaders Tuesday, April 20. After a few hours the strikers went to work. The CIO has sought a signed contract with the company.

BITUMINOUS COAL COSTS RAISED $100,000,000 YEARLY

Cost of mining the nation's bituminous coal supply will be increased $100,000,000 in the coming year, according to the National Coal association.

Predominant factor in the rise is the recent wage increase for miners. Social security and other taxes and higher costs of supplies and materials also are cited.

Added costs, estimated at 25 cents a ton, must be passed along to consumers, J. D. Battle, association secretary, declared. He explained that operators' profit margins were narrow before costs increased.

Recent advance raises coal miners' minimum wage to a higher point than that in the steel industry. Common labor rate is increased 50 cents a day to 85¾ cents hourly minimum for northern miners. This nets the mine laborer $6 for a 7-hour day and $30 for a 35-hour week. Southern miners' wages are 80 cents an hour, $5.60 a day and $28 a week. In comparison steelworkers' minimum wages are 62½ cents an hour, $5 for an 8-hour day and $25 for basic 40-hour week.

Manufacturers To Study Agricultural Problems

Organized study of six major phases of agriculture has been undertaken by the National Association of Manufacturers, to provide industry with a better understanding of the farm situation.

They include farm tenancy, marginal farmers and marginal farm lands, financing agriculture, marketing farm products, the farm as a place to live, and conservation of natural resources utilized for agricultural production.

Results will be published in a series of bulletins to be distributed to manufacturers. The committee includes: E. H. Hooker, president, Electrochemical Corp., New York; Lewis H. Brown, president, Johns-Manville Corp., New York; James W. Hook, president, Geometric Tool Co., New Haven, Conn.; and Dr. Robert Martin, National Industrial Conference board. Dr. John Lee Coulter, former tariff commissioner, will be technical adviser.

Scrap Committee Sets Regional Meetings Dates

The first of a series of regional meetings to consider means of restricting scrap exports was held at the Bellevue Stratford hotel, Philadelphia, April 10, under the auspices of the newly organized Independent Iron and Steel Producers Committee on Scrap.

Regional meetings are scheduled to be held at the Hotel Commodore, New York, April 12; at the William Penn hotel, Pittsburgh, April 13; Hotel Cleveland, Cleveland, April 14, and at the Palmer House, Chicago, April 15.

Other meetings are planned shortly in the South and other points, which all independent scrap consumers are invited to attend.

Meanwhile, the Institute of Scrap Iron and Steel continues to withhold comment on this movement as well as on the proposal of Senator Schwellenbach, Washington, who week before last introduced a bill in the senate proposing the licensing of scrap.

While both measures are aimed at restriction of scrap exports, the Independent Iron and Steel Producers Committee on Scrap declares that its program is in no way linked with the proposal of Senator Schwellenbach.

Aluminum Company To Build Shape, Tubing Plant

Announcement that the Aluminum Company of America will immediately build a large plant at La Fayette, Ind., to manufacture extruded shapes and tubing has been confirmed by Arthur V. Davis, board chairman. It will be part of an expansion program for various localities this year, amounting to $26,000,000.

On the question of increased metal prices due to abnormal demand for all metals, Mr. Davis predicted there will not be any run-away market in aluminum. He stated that the company's management is sympathetic with the effort to restrain advances in prices of durable and consumer goods, and that the company's policy for the remainder of 1937 will be to maintain present prices, and make advances only if necessary to meet increased costs of labor and raw materials.

Machinery Exports Gain; Construction Tools Lead

Machinery exports in February were valued at $15,838,957, compared with $13,181,945 in February, 1936, an increase of 20 per cent. Exports by groups, with percentage change from February, 1936, are shown in the following table:

	February 1937	Per cent Change
Power machinery, except automotive	$1,096,333	+ 74
Construction	1,244,848	+140
Mining	3,587,507	+ 29
Power-driven	4,061,919	+ 7
Other metal-working	308,228	— 35
Textile	1,384,853	— 12
Other industrial mach.	3,281,022	+ 32
Printing	874,247	— 20
Total	$15,838,957	+ 20

Gain in power-generating and conveying machinery was due to sharply increased exports of mechanical drive turbines, diesel and semidiesel engines. Exports of excavators advanced from $29,037 in February, 1936, to $367,328 in February this year. Concrete mixers increased from $25,733 to $140,115; road graders from $49,467 to $96,848. Substantial gains were made in other items in the construction group.

Mining, well and pumping machinery foreign sales increased generally, with a noteworthy advance in oil and gas well-drilling apparatus from $568,786 to $1,004,351.

Engine lathes shipments declined to $146,661 from $395,467, while turret lathes advanced to $200,090 from $112,217. Other power-driven metal-working machinery showing increases included thread cutting and automatic screw machines, milling machines, gear cutting machines, planers and shapers, grinders and sheet metal-working machines.

Printing and bookbinding machinery, textile, sewing and shoe machinery declined.

Allegheny Adding Furnace

Allegheny Steel Co. has commenced the installation at its Brackenridge, Pa., plant of an additional 25-ton electric melting furnace for production of specialty steels which form the company's principal output. It will add 3000 tons a month to capacity. Orders for stainless steels booked by the company during March were the largest for any month in its history, according to W. F. Detwiler, executive vice president.

Points to Changes Periling South's Competitive Situation

MORE than a million tons of new open-hearth capacity was added in this country during 1936 and management now is reaping the benefit of its foresight. It is not too late to expand steelmaking facilities further to effect a decrease in cost of production. The supply of scrap is acute at present and under this circumstance steelmakers are obliged to charge more hot metal.

These facts were brought out by G. D. Tranter, general superintendent, American Rolling Mill Co., Middletown, O., at the twentieth annual meeting of the Open-Hearth committee of the American Institute of Mining and Metallurgical Engineers in Birmingham, Ala., April 7-9.

South May Lose Markets

W. E. Curran, superintendent, Thomas blast furnaces and coke works, Republic Steel Corp., Birmingham, told members of the institute's Blast Furnace and Raw Materials committee, meeting simultaneously, that if northern and midwestern markets are to be retained by southern blast furnaces, management must adopt new policies to offset elimination of the wage differential between the North and South.

Southern iron producers pay 10 to 20 per cent lower wages than northern producers, and this differential shortly is to be removed entirely, Mr. Curran announced.

Producers in the Birmingham district ship considerable iron to Michigan, Ohio, Pennsylvania, Kansas, Missouri, and Illinois. To ship this distance, the freight rate of $4 to $6 per ton must be absorbed, he continued.

As southern labor rates approach northern rates, northern competition in the iron industry becomes stronger. For this reason, the South must practice new economies such as improving the quality of raw materials and finding higher price markets for slag. Mr. Curran also suggested sintering blast furnace flue dust to recover some iron normally a loss.

Addressing a joint dinner of the two groups, A. A. Nicholson, personnel director, Texas Co., New York, made a plea for management to look to the surging masses and endeavor to find something that will furnish a key to better understanding. The bridge between management and men has been washed out by the flood and waves of misunderstanding, he stated. The weak link is the intermediate line called supervision. How the masses are to see the light is the problem of management, Mr. Nicholson declared.

Continuing, he said that new competition faces industry and this will become rabid. Industry must recognize and heed this fact with sound supervision. The loyalty of men is more open to capture than at any time in industrial history.

Industry cannot look inside men with instruments and expect to find loyalty—the problem is one of sound management. Executives must sell men on the spirit of the organization of which they are a part, Mr. Nicholson admonished.

Various operations at steelworks in England, France, Germany, Russia and Sweden were described by E. C. Smith, chief metallurgist, Republic Steel Corp., Cleveland. He expressed the opinion that the basic bessemer steelmaking process largely followed by European makers may be inaugurated in this country within the next few years.

Europe Overcomes Handicaps

Mr. Smith mentioned that pig iron is being manufactured at a plant in Corby, England, cheaper than any place in the world except India, despite the high sulphur ores. In discussing the Perrin steelmaking process as followed in France, he pointed out that poorer raw materials are used without any appreciable effect on the quality of steel.

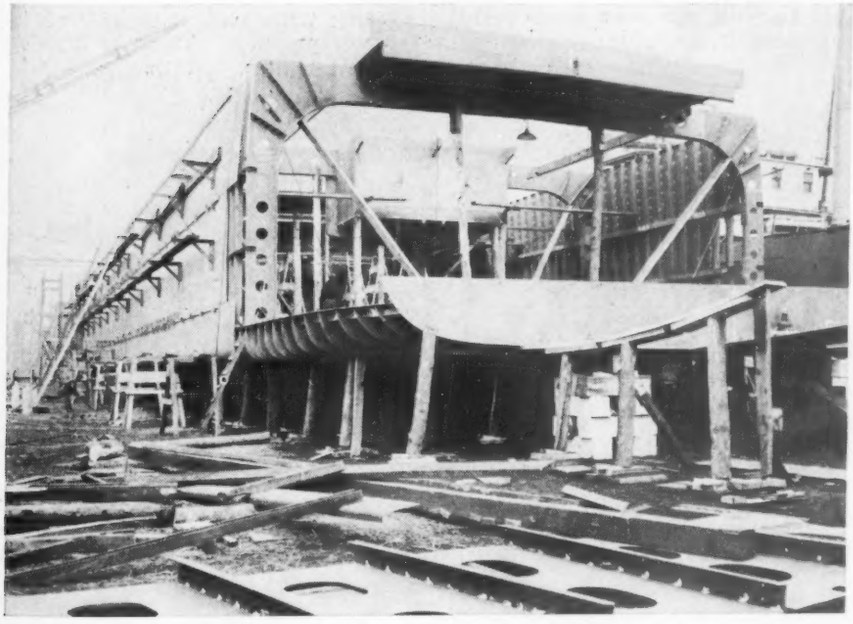
Next year's meeting of the Open-Hearth committee will be held either in Cleveland or Buffalo and some thought is to be given to exhibits of open-hearth furnace materials by company representatives. The Blast Furnace and Raw Materials division also plans to hold its annual session simultaneously as was done this year for the first time.

Attendance at the Birmingham meeting totaled 450, of which 250 were representatives of the open-hearth group and 200 of the blast furnace group.

In opening the first session of the open-hearth division, Chairman Tranter cited the fact that the steel industry in this country is in a state of flux. Despite the many new developments in open-hearth practice, the heat transfer is not as efficient as it should be and he voiced the opinion that the remedy lies perhaps in the use of refractories.

He called attention to activity of the open-hearth group in forming local sections in various steel producing districts which has provided a means of bringing operators together. A move soon will be made to establish a local group either in Cleveland or Youngstown.

All-Welded Motorship Under Construction



THIS ship, which is attracting considerable attention because of the telescopic pilot house that will sink into the hold when passing bridges, will be 300 feet long, 43 feet wide and 20 feet deep. It will cost approximately $450,000 and will be powered by diesel gear reduction machinery. One of two being built at Ford dock yards near River Rouge plant, the carrier will transport Ford parts to eastern assembly plants. Wide World photo

U. S. Steel's Labor and Fiscal Policies Applauded at Stockholders' Meeting

APPLAUSE for the management's labor and fiscal policies featured the thirty-seventh annual meeting of United States Steel Corp. stockholders in Hoboken, N. J., last week. Significantly, it was the first time when they as a group had an opportunity to hear directly from Chairman Myron C. Taylor, since five corporation subsidiaries last month decided to raise wages and recognize organized labor as a bargaining agent for employes.

Three hundred crowded into the meeting room on the fourth floor of the Hudson Trust Co. building. A spirit of harmony and good feeling was apparent long before the chairman delivered his address. Mr. Taylor praised the shareholders for their patience—not since March 30, 1932 have dividends been paid on U. S. Steel common—and he intimated that they will soon be rewarded.

Only three stockholders asked questions. One wanted to know how the workmen felt, whether they were satisfied.

"I should say they were so, entirely so," Mr. Taylor replied.

"Not like Detroit?"

"Oh, no," he rejoined.

Another lauded the management for its financial policy in reducing bonded indebtedness early in the depression, saving millions in interest charges.

Corporation Officials Introduced

In introducing the corporation officers, Mr. Taylor presented most presidents and several higher executives of the subsidiary companies. Rounds of applause greeted each.

Especially enthusiastic were greetings to James A. Farrell and William J. Filbert, veterans in the corporation's affairs.

Since he first addressed the stockholders nine years ago, Mr. Taylor said, a changing cycle had occurred in the economic field unparalleled in the history of the country. He outlines the many steps taken by the management, including reorganization among the subsidiaries and parent corporation, which had enabled the organization to steer through the depression.

Incidentally, there were some who interpreted the tone and tenor of Mr. Taylor's remarks as a possible farewell as chairman of the board. He said in part:

"If, through any chance, the vicissitudes of time or circumstances should make it impossible for any of us to gather here together in this way next year, I want to express openly my appreciation—my own very great pleasure in this association with our stockholders and executives, although the work and experience have been difficult in the extreme."

Discussing industrial relations, he declared:

"The corporation is an instrument of social progress, serving the nation with finished products within the range of the power of the consumer to pay. No real conflict exists between the workers, producers or consumer. One can be created, but when that happens everybody loses."

The net average annual return on the average amount of assets used in the business during the 9-year period, 1928 to 1937, was about 2.8 per cent, according to Mr. Taylor. This included two good years —1928 and 1929. Seven ranged from lean to very lean. The net loss to the owners during that period was approximately $53,000,000.

Commenting on the increasing number of young men annually presented to the stockholders, Chairman Taylor held this to be a good omen, saying: "These young men will be with you year after year."

Edward R. Settinius Jr., chairman of the finance committee, his possible successor, and Junius Spencer Morgan, elder son of J. P. Morgan and grandson of the financial founder of the corporation, who is a director, sat at the chairman's left, and obviously were included in this reference; also Messrs. Fairless, Perry, Zimmerman, Hood, Harris, Watson and Hughes among others.

Forty years is the average age of all employes of the corporation, he said, most of them between 30 and 50. The number of employes between 25 and 30 years is slightly in excess of the number between 50 and 55. However, those between 55 and 60 are slightly more numerous than those between 20 and 25 years of age. Average age of the directors is now 59. In 1928 it was 64. The average age of the last six directors elected is 45 years. Principal executives now average 55 against 65 years in 1928. But four of these executives hold the same position they held in 1927. Promotion has come to most of the others, Mr. Taylor stated.

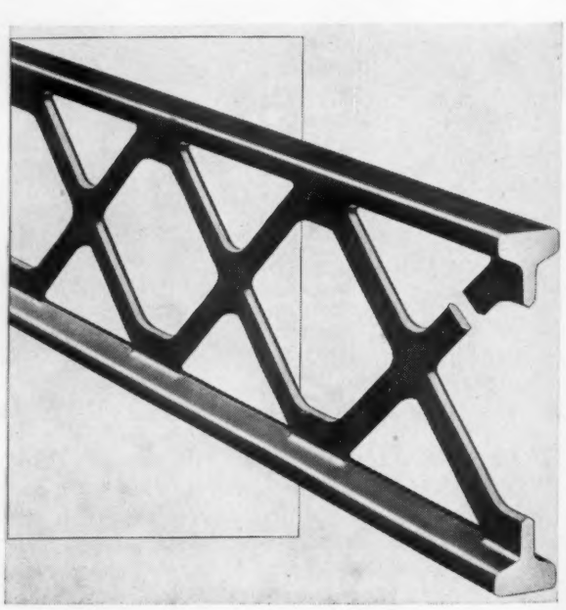
Explains Promotion Policy

While promotions to executive leadership has occurred largely within the corporation, Mr. Taylor declared there had been no hesitation in going outside the organization to obtain the right man for a particular place. This was interpreted by observers as a reference to B. F. Fairless as president of the Carnegie-Illinois Steel Corp.

Referring to the subsidiaries, Mr. Taylor outlined efforts to concentrate on fewer but more efficient operating units with a greater diversity of products. There is a move toward lighter, but tougher steels,

New Type Reinforcing Sections Speed Construction

A NEW type of truss section for reinforcing bridge and other heavy duty floors has been developed by Jones & Laughlin Steel Corp., Pittsburgh. Known as "Jaltruss," it is a one-piece section of double Warren truss design. Advantages include constant dimensions, uniform strength, straightness and elimination of irregularities. It is made in a range of sizes and weights, with lengths unrestricted. Sections are easy to handle due to their light weight



he said, mentioning the low alloy Cor-ten, and stating 2 pounds of this alloy would serve the purpose of 3 pounds of ordinary steel for many uses. Heat treating research and other metallurgical progress in a similar direction were reviewed.

Always a leader in social welfare among its employes and the communities in which it operates, the corporation, said Mr. Taylor, for many years has sponsored such activities as pensions, safety campaigns, sanitary programs, group life insurance, employe representation, home-owning plans, vacations with pay. The apprentice shop training course, really an industrial university, with every reasonable aid offered deserving and promising young men was stressed by the chairman. The plan has gained great momentum in Carnegie-Illinois plants.

"Fair dealing with our employes is good business," declared Mr. Taylor. "We followed this policy in the depression and we are proud of our record in this respect."

He stated work was spread among the employes during the depression until operations became so low, about 18.3 per cent in 1932, there was not enough work to spread. Then the corporation gave direct assistance, home relief in many instances and loans.

Costs Forced Up Prices

Reviewing briefly the agreement with SWOC for collective bargaining for its members only, Mr. Taylor stated the employe representative plan still is in operation. The wage increases, combined with higher cost of raw materials, made it necessary to raise steel prices to consumers.

"As to the future, I would not care to prophesy," he declared.

He stressed the increased per capita consumption of steel in the United States during the last two years. It was 250 pounds in 1935. Consumption rose to 810 pounds per capita last year and thus far for 1937 it is at a rate of 960 pounds. Ingot operations at corporation plants are at 87 per cent of capacity.

Near the close of the session, Chairman Taylor, again thanking the stockholders for their co-operation, ventured the hope that their patience would be substantially rewarded in the near future. A unanimous vote of thanks was given the management. The management held proxies for 2,022,860 preferred and 4,901,479 common shares, or 56.14 per cent, and 56.33 per cent of total shares, respectively. The vote for re-election of six retiring directors for three years and for re-election of Price, Waterhouse & Co. as auditors was 2,023,943 preferred and 4,935,313 common shares.

Copper, Tin, Zinc Prices Off Sharply

MAJOR nonferrous metal markets were unsettled last week by a sharp drop in prices, which carried quotations $30 per ton lower in copper, $60 in tin, and $18 to $20 in zinc. The revaluation was due to a general price slump on the London metal exchange, rather than to any weakening in the statistical position of the market, or any diminution in consumer demand.

The cause of the decline in prices on the London metal exchange was complex. The movement was initiated by moderate selling of speculative holdings which gained momentum steadily and which became heavy when large stop-loss orders were uncovered. At least a slight reaction had been expected as a natural aftermath of the sharp rise during March which had carried prices to new highs for recent years.

The selling movement was more than a technical reaction, however, as it was accelerated by other considerations. It is believed that President Roosevelt's statement that commodity prices were too high, and the brighter outlook for a possible settlement of the European political situation tended to shake confidence in the soundness of the metal price structure.

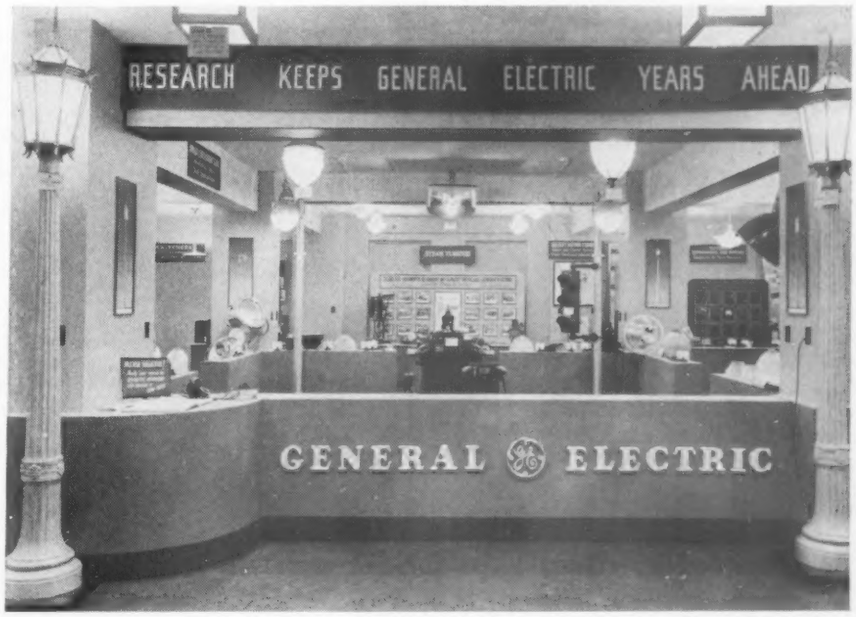
Uncertainty was heightened further by rumors, which later were declared unfounded, that an embargo on gold shipments into the United States and a reduction in the official American price of gold were being considered in Washington.

Despite the weakness in prices, supplies of most metals available for nearby shipment continue limited with an actual scarcity existing in some of the markets. Evidence of the strong statistical position of the markets was given Thursday when business was being transacted in copper by primary mine producers at 16.00c, Connecticut, after custom smelters had lowered their prices to the basis of 15.50c, and in zinc by some sellers at 7.50c, East St. Louis, after the general market had slipped to 7.00c.

Rolling Mill Patent Litigation Settled

American Rolling Mill Co., Middletown, O., announced last week that it has licensed Allegheny Steel Co., Brackenridge, Pa., under its patents for continuous rolling of sheet and strip steel and the pending suit between the two companies has been dismissed. Allegheny Steel Co.'s countersuit against American Rolling Mill on its patents relating to production of automobile sheets also has been dismissed, and American Rolling Mill has taken over control of the patents involved in the countersuit.

General Electric Exhibits Products for Industry



AN EXHIBIT of electrical products for industry has been opened in the General Electric building, 570 Lexington avenue, New York. It brings together, in 7000 square feet of floor space, representative products of General Electric and affiliates. Much of the equipment is in operation. Adjoining the exhibit is a conference room, for lectures and motion picture films

Record for Ingots In First Quarter

STEEL ingot production has established a new record for first quarters. Output in the first three months this year was 14,390,787 gross tons, 54 per cent larger than the 9,352,983 tons made during the similar period in 1936. The previous first-quarter record was 13,897,020 tons, in 1929, according to the American Iron and Steel institute.

In a forecast of a record-breaking first quarter, STEEL, March 22, page 17, estimated probable production at 14,264,000 tons, which was 126,787 tons below the actual figures. The next mark to be overcome in attaining a new all-time quarterly output is 15,139,000 tons, made in second quarter of 1929. This is 748,213 tons greater than the total for first quarter of this year.

Total production in March was 5,229,431 gross tons, an increase of 18 per cent over February and 56 per cent larger than the 3,342,619 tons made in March, 1936. March output has been exceeded only once before, in May, 1929, when 5,286,246 tons were made.

March tonnage was equivalent to 90.13 per cent of the steel industry's capacity. For the quarter it was 85.44 per cent of capacity. By comparison, the industry operated at 57.61 per cent of capacity in March, 1936, and at 54.93 per cent during first quarter of last year.

Weekly average production in March was 1,180,458 tons, compared with 754,542 tons in March, 1936. For first quarter this year the weekly average production was 1,119,035 tons, compared with 719,460 tons for the corresponding period of 1936.

UNITED STATES LEADS IN STEEL USED PER FAMILY

Apparent consumption of finished steel in the United States in 1936 was about 2350 pounds to the average family, compared with 1700 pounds in 1935, the highest per family consumption since 1929. No foreign steel-producing country comes within 20 per cent of this figure, according to the American Iron and Steel institute. The 1936 figure, however, was 12 per cent below the 2675 pounds per family from 1925 through 1929 and about 20 per cent below the 2950-pound peak in 1929.

Reflecting the steady advance in American standards of living, steel consumption per family has risen from 1900 when 1060 pounds were consumed by the average family. The major setbacks were in 1908 and 1921 when the figure dropped to 1138 and 1075 pounds, respectively, and during the present depression when it went as low as 760 pounds per family.

Per family consumption in 1936 was 500 pounds higher than in any foreign country. Germany led with apparent consumption of 1850 pounds per family. Belgium-Luxemburg consumed 1720 pounds, Great Britain 1350 pounds, France 1250 pounds, Russia 60 pounds and Japan 40 pounds.

Dawes Predicts Peak This Year and in 1938

This year and 1938 probably will see the the peak in the current business upturn, according to Gen. Charles G. Dawes, Chicago banker and former United States vice president. Gen. Dawes, who has been successful in predicting business trends the past few years, expressed this opinion in a recent talk in Chicago before bank credit officials.

He recommended that trust funds invested in common stocks during the depression be transferred into good bonds and mortgages, stating that interest rates on the latter are bound to rise while average stock prices will be lower in the "not too distant future."

Valley Mills Set New Output Records in March

Valley steelmakers set new records in March. Youngstown Sheet & Tube Co., Youngstown, O., rolled 85,000 tons on its 79-inch hot strip mill. Its former high mark was in January with 76,000 tons.

Republic Steel Corp. in the Youngstown-Warren area attained new monthly records in ingot tonnage, mill production and shipments.

Carnegie-Illinois Steel Corp. Valley plants established an all-time monthly record, not disclosed, above their prior mark of 99,000 tons, achieved in October, 1928. Sharon Steel Corp. exceeded its best former strip mill output and came close to making its largest monthly ingot tonnage.

To Process Manganese In New Cuban Plant

Installation of new equipment at a cost of $500,000 has been virtually completed by the Cuban-American Manganese Corp., New York, Langbourne M. Williams Jr., president, at its plant for processing manganese ore near Santiago, Cuba.

The company expects production by the improved processes at this plant to introduce a new factor into the world manganese situation. According to statistics by the bureau of mines, the company states, 95 per cent of the manganese consumed in this country goes into steel manufacture. Of manganese imports in 1936 fully 96 per cent was brought from other continents, subject to hazards of shipping on the high seas. The company's plant is situated about 90 miles from the Florida coast, making shipment easy.

Steel Ingot Statistics

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 98.03 per cent

	—Open Hearth—		—Bessemer—		—— Total ——		Weekly production, all companies,	Number of weeks
1937	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	gross tons	in month
Jan.	4,444,903	84.43	291.794	54.30	4,736,697	81.64	1,069,232	4.43
Feb.	4,092,990	86.10	331,669	68.35	4,424,659	84.46	1,106,165	4.00
March	4,825,644	91.66	403,787	75.14	5,229,431	90.13	1,180,458	4.43
3 mos.	13,363,537	87.44	1,027,250	65.85	14,390,787	85.44	1,119,035	12.86
1936								
Jan.	2,849,557	54.88	196,389	32.21	3,045,946	52.50	687,572	4.43
Feb.	2,761,973	56.92	202,445	35.53	2,964,418	54.67	716,043	4.14
March	3,157,579	60.81	185,040	30.35	3,342,619	57.61	754,542	4.43
3 mos.	8,769,109	57.55	583,874	32.63	9,352,983	54.93	719,460	13.00
April	3,637,479	72.34	304,775	51.62	3,942,254	70.16	918,940	4.29
May	3,744,161	72.10	302,092	49.55	4,046,253	69.73	913,375	4.43
June	3,649,948	72.58	334,897	56.72	3,984,845	70.92	928,868	4.29
July	3,596,125	69.41	326,606	53.69	3,922,731	67.76	887,496	4.42
Aug.	3,844,570	74.04	350,560	57.50	4,195,130	72.30	946,982	4.43
Sept.	3,858,060	76.90	303,048	51.45	4,161,108	74.23	972,221	4.28
Oct.	4,227,291	81.41	317,710	52.11	4,545,001	78.33	1,025,960	4.43
Nov.	4,007,859	79.70	329,553	55.82	4,337,412	77.19	1,011,052	4.29
Dec.	4,127,049	79.66	304,596	50.07	4,431,645	76.55	1,002,635	4.42
Total	43,461,651	70.92	3,457,711	48.06	46,919,362	68.52	897,463	52.28

Percentages of capacity for 1937 are calculated on weekly capacities of 1,188,452 gross tons for open-hearth ingots, 121,308 tons for bessemer and 1,309,760 tons total, based on annual capacities as of Dec. 31, 1936, as follows: Open-hearth ingots, 61,965,862 gross tons; bessemer, 6,325,000 tons; for 1936, on weekly capacities of 1,172,160 gross tons open-hearth ingots, 137,624 tons bessemer, 1,309,784 tons total, based on annual capacities as of Dec. 31, 1935, as follows: Open-hearth ingots 61,280,509 gross tons, bessemer 7,195,000 gross tons.

Gulf States Now Republic Division

MINES and plants of Gulf States Steel Co. became a division of Republic Steel Corp. last week following Gulf States stockholders' approval of purchase terms. These included assumption by Republic of Gulf States' bonded and other indebtedness and exchange of Republic common stock for Gulf States common in the ratio of two and one-third Republic shares for one of Gulf States.

L. E. Geohegan, formerly vice president and general manager of Gulf States, will head operations as district manager. The sales organizations of the two companies will be combined and personnel announcements will be made shortly. Present operations in the Birmingham district will continue under direction of Wade Oldham, as Birmingham district manager.

"The addition of Gulf States plants and properties will greatly strengthen Republic's position in the South," said T. M. Girdler, chairman and president of Republic.

"At Birmingham Republic has had ample iron ore supplies and pig iron capacity but hitherto has had no steelmaking facilities in the South. The Gulf States plants at Gadsden furnish these facilities. Republic's furnaces and mines at Birmingham and Gulf States' mills at Gadsden supplement each other and the operation of both under Republic management will effect substantial economies.

"It is my belief that the South is entering upon a period of increasing industrial activity and that within a few years it may consume considerably more steel than it does today."

To Republic's 6,053,000 tons annual ingot capacity now is added Gulf States' 400,500 tons. Gulf States capacity for finished hot rolled products is approximately 300,000 tons; pig iron 180,000 tons, and coke, 180,000 tons. Its ore mines at Shannon, Ala., have annual capacity for 384,000 tons; coal mines at Altoona, Sayre and Virginia, Ala., 790,000 tons.

Chemical Engineers Move

American Institute of Chemical Engineers has moved its office from Philadelphia to the Engineering Societies building, 29 West Thirty-ninth street, New York. Stephen L. Tyler, engineer for Thermal Syndicate Ltd., New York, has succeeded Frederick J. LeMaistre as executive secretary.

District Steel Rate

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended April 10	Change	Same week 1936	Same week 1935
Pittsburgh ..	95	None	57	34
Chicago	84	None	68	50½
Eastern Pa...	59½	None	42	29½
Youngstown..	87	+ 1	76	55
Wheeling	96	None	76	76
Cleveland ...	74	— 5½	86	64
Buffalo	88	— 1	62	34
Birmingham..	80	None	69	55½
New England	95	+10	78	52
Detroit	100	None	100	82
Cincinnati ...	90	+10	76	†
St. Louis.....	82	None	†	†
Average....	91½	None	66½	45

†Not reported.

Production

STEELMAKING capacity held at 91½ per cent last week. Small gains at Youngstown and Cincinnati were balanced by losses at Cleveland and Buffalo, while all other steelmaking centers were steady.

New England—Increased 10 points to 95 per cent.

Chicago—Held at 84 per cent. An increase is in early prospect, however, since Carnegie-Illinois Steel Corp. plans to start its No. 2 open hearth plant at Gary about the middle of this month and is lighting an additional blast furnace there. Thirty-one out of 39 stacks are active.

Cincinnati—Up 10 points to 90 per cent, with 21 open hearths lighted.

Pittsburgh—Held at 95 per cent, highest point in eight years. Forty-seven blast furnaces are active.

Wheeling—Unchanged at 96 per cent.

Buffalo—Down 1 point to 88 per cent, as Wickwire Spencer Steel Corp. took off an open hearth for repairs. The furnace will be resumed the latter part of this week and with the report that Republic, now operating seven furnaces, will put another in operation at that time, ingot output is expected to reach a new high.

Birmingham—Steady at 80 per cent.

St. Louis—Held at 82 per cent

Central eastern seaboard—Unchanged at 59 to 60 per cent, with little variation expected.

Youngstown—Gained 1 point to 87 per cent, with addition of an open hearth at the Farrell, Pa., plant of Carnegie-Illinois Steel Corp. A drop to 86 per cent is indicated for this week as one furnace at the Sharon Steel Corp.'s works at Lowellville is scheduled to go out.

Cleveland-Lorain — Dropped 5½ points to 74 per cent as Corrigan, McKinney division of Republic Steel Corp. and Otis Steel Co. each operated one less furnace during the week, making a total of 29 units active.

Detroit—Held at 100 per cent, with all 21 units melting.

Modern Methods, Materials Reduce Lounge Car's Weight 15 Tons

BY USING new methods and materials the St. Louis-San Francisco railroad has reduced the weight of a lounge car 30,000 pounds. It has built and placed in service three cars of this type, chiefly of "Yoloy," Youngstown Sheet & Tube Co.'s nickel-copper alloy steel. Liberal use of steel also is made in dining room furniture, lockers, pantry and kitchen. Low center of gravity of these cars contributes to higher speeds

February Imports Hold Steady Rate

IMPORTS of steel and iron products into the United States in February were slightly lower than in January, according to the metals and minerals division of the department of commerce. The slight difference is more than accounted for by the shorter month.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1937		1936	
	Imports	Exports	Imports	Exports
Jan.	43,063	201,692	50,489	241,564
Feb.	411,628	290,987	43,358	213,802
March	.....	.....	56,720	264,337
April	.....	.....	49,621	301,987
May	.....	.....	59,391	314,950
June	.....	.....	59,910	294,951
July	.....	.....	47,940	296,738
Aug.	.....	.....	60,697	295,341
Sept.	.....	.....	59,993	235,571
Oct.	.....	.....	64,509	261,882
Nov.	.....	.....	61,970	203,297
Dec.	.....	.....	52,584	244,156
Total	.....	.....	666,838	3,162,694

Excluding scrap, imports were 39,157 gross tons, valued at $1,671,272, in February, compared with 40,642 tons valued at $1,716,324 in January and 35,796 tons, valued at $1,447,897, in February, 1936.

Pig iron furnished the largest tonnage, 11,340 tons, compared with 12,434 tons in February, 1936. This came principally from British India, Soviet Russia and the Netherlands. Structural shapes at 6762 tons were second in volume, compared with 3112 tons in February, 1936, with Belgium the principal supplier. Structural shapes showed the greatest gain over January, with hoops and bands and steel bars also considerably increased.

Belgium was the largest contributor, with 12,516 tons, in a wide variety of products, British India with 5863 tons, all of pig iron, Germany, Sweden, Soviet Russia and Canada following in the order named.

In two months aggregate imports, including scrap, reached 79,799 tons, valued at $3,387,598, compared with 78,571 tons, valued at $3,240,517, in the corresponding period of 1936.

Scrap imports in February of this year were 2471 tons, valued at $33,338, compared with 2421 tons, valued at $35,517 in January and 7562 tons, valued at $66,085, in February, 1936. In two months of this year the aggregate of scrap imports was 4892 tons, valued at $68,855, compared with 15,276 tons, valued at $120,433 in the like period last year. Canada in both periods furnished nearly all the imported scrap.

ORIGIN OF FEBRUARY IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Norway	22,968	275	.....	682
Mexico	142	.....	.....	.....
United Kingd.	119	.....	.....	94
Canada	120	653	51	.....
Cuba	33,000	.....	5,672	.....
Chile	128,600	.....	.....	.....
Australia	13,704	.....	.....	.....
Philippine Is.	350	.....	.....	.....
Brazil	11,000	.....	.....	.....
U. S. S. R.	.....	2,967	3,638	.....
Germany	.....	50	7	.....
Netherlands	.....	1,332	.....	.....
Sweden	.....	200	.....	.....
British India	.....	5,863	3,402	.....
Nethrld. India	.....	.....	14	.....
Gold Coast	.....	.....	7,394	.....
Czechoslovakia	.....	.....	5	550
France	.....	.....	.....	42
Italy	.....	.....	.....	42
Japan	.....	.....	.....	93
Poland	.....	.....	.....	48
Total	210,003	11,340	20,183	1,551

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Belgium	707	5,660	.....	1,793
Germany	159	103	.....	176
France	70	990	.....	333
Sweden	5	.....	179	.....
United Kingdom	4	.....	10	102
Norway	.....	.....	10	.....
Spain	.....	.....	.....	3
Total	945	6,753	199	2,407

Stamped, Pressed Metal Products Industry Gains

Sharp gains in production and employment by manufacturers of stamped and pressed metal products and in enameling and japanning in 1935 over 1933 are recorded by the bureau of the census.

This industry employed 50,014 wage earners in 1935, an increase of 54.8 per cent over 32,302 reported for 1933, and their wages, $51,182,706, exceeded the 1933 figure, $26,633,559, by 92.2 per cent. Output value in 1935 totaled $239,220,427, an increase 76.4 per cent over 1933.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Feb. 1937	Jan. 1937	Jan. thru Feb.'37
Pig iron	11,340	12,434	23,774
Sponge iron	1,117	279	1,396
Ferromanganese (1)	1,550	2,370	3,920
Spiegeleisen	1,230	660	1,890
Ferrochrome (2)	16	53	69
Ferrosilicon (3)	119	114	233
Other ferroalloys (4)	50	2	52
Steel ingots, blooms	1	109	110
Billets	185	51	236
Concrete rein. bars	98	772	870
Hollow bar, drill steel	199	164	363
Bars, solid or hollow	3,480	5,104	8,584
Iron slabs	.....	.....	.....
Iron bars	128	137	265
Wire rods	974	1,626	2,600
Boiler, other plate	8	20	28
Sheets, skelp, sawpl.	945	1,496	2,441
Die blocks or blanks	11	2	13
Tin plate, taggers', terne plate	2	41	43
Structural shapes	6,762	7,919	14,681
Sheet piling	512	1	513
Sashes, frames (5)	.....	.....	.....
Rails, fastenings	1,477	180	1,657
Cast iron pipe, ftgs.	227	177	404
Mall. iron pipe ftgs.	34	29	63
Welded pipe	137	249	386
Other pipe	1,568	475	2,043
Cotton ties	349	.....	349
Hoops and bands	2,407	2,141	4,548
Barbed wire	920	1,585	2,505
Iron and steel wire	453	325	778
Teleg. and tele. wire	.....	6	6
Flat wire and strips	225	282	507
Wire rope and strand	197	227	424
Other wire	279	278	557
Nails, tacks, staples	1,704	1,171	2,875
Bolts, nuts, rivets	91	24	115
Horse, mule shoes	22	24	46
Castings, forgings	340	115	455
Total gross tons	39,157	40,642	79,799
Iron and steel scrap	2,471	2,421	4,892
GRAND TOTAL	41,628	43,063	84,691

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content; (5) formerly included in "Structural shapes."

Will Conduct Arc Welding Course in Pittsburgh

A course in arc welding design and practice, sponsored by the Lincoln Electric Co., Cleveland, will be conducted in Pittsburgh, April 19-23. The meetings, under direction of E. W. P. Smith, Cleveland welding authority, will be held at the Clifford B. Connelly Trade school, 1500 Bedford avenue.

Lecturers will include H. C. Boardman, director of research, Chicago Bridge & Iron Co., Chicago; Thomas Johnston, engineering department, Whitehead & Kales Co., Detroit; E. E. Tross, plant manager, United Engineering & Foundry Co., Youngstown, O.; F. L. Plummer, associate professor of structural engineering, Case School of Applied Science, Cleveland; L. C. Bibber, welding engineer, Carnegie-Illinois Steel Corp., Pittsburgh; and Mr. Smith.

Their subjects will cover weld inspection, stress distribution, welding standards, field welded steel tanks, machinery fabrication and design calculations.

Paper Industry Expands, Buys Heavy Equipment

Blaw-Knox Co., Pittsburgh, has received orders for six large sulphate pulp digesters in the past three months, indicating expansion in the kraft paper industry.

Orders have been booked or shipped to the following: Longview Fibre Co., Longview, Wash.; Brunswick Pulp & Paper Co., Brunswick, Ga.; Thilmany Pulp & Paper Co., Thilmany, Wis.; St. Helens Pulp & Paper Co., St. Helens, Oreg.; Chesapeake-Camp Corp., Franklin, Va.; and International Paper Co., Ticonderoga, N. Y.

Kraft digesters are of all-welded construction made from 1½-inch plate. When completed, they are annealed in one piece. Blaw-Knox Co.'s process equipment division specializes in vessels of this type. Pulp digesters usually are built as large as can be shipped.

Combines Lobby, Steel Show Room

REPUBLIC STEEL CORP.'S recently completed reception lobby on the fourteenth floor, Republic building, Cleveland, is an excellent example of modern decorative design coupled with effective product displays. The lobby serves the corporation's general offices.

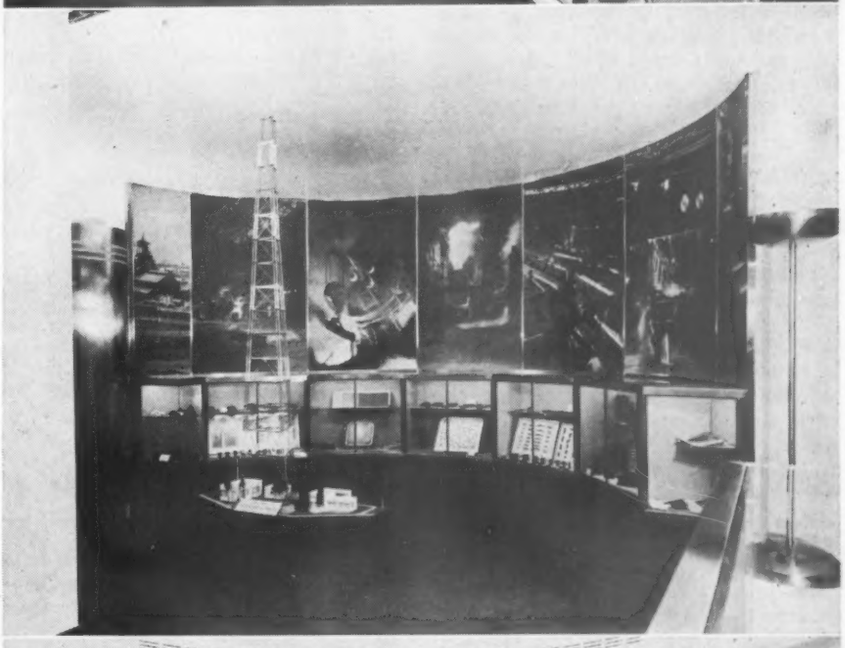
Steel plays an important part in the color scheme. Soft, silvery sheen of stainless steel in display cases, elevator door decoration, lighting fixtures, wall panels and furniture trim contrasts with rich tones in rugs and furniture.

Covering one semicircular wall is a series of large photomurals which portray the basic steps in steelmaking. The first scene shows a modern blast furnace, with ore boats and unloading machinery in the background. The next mural is the charging floor of an open-hearth furnace. The third depicts tapping of an electric furnace.

Others include a colorful night view of a bessemer converter in operation, a bar mill, an electric weld pipe mill, an exclusive Republic process, and a reversible cold strip mill. In a wall case beneath the murals are displayed specimen products.

Typical applications of the products of Republic and its subsidiaries are shown in other wall cases. Two island display cases contain special steel products.

The lobby is air conditioned throughout, indirect lighting eliminates shadows and places the most effective light on displays. All display cases, furniture and lighting fixtures were custom built and individually designed for the room. The accompanying illustrations show this unique reception room.



Dressing Up 71 Broadway, Home of U. S. Steel Corp.

Headquarters of the United States Steel Corp., Empire building, 71 Broadway, New York, will undergo alterations. While plans are incomplete, changes probably will be made in the main lobby floor plan, and stainless steel and marble substituted for the rococo ornamentation that was characteristic in the late nineteenth century when the building was erected. Cleaning of the exterior also is contemplated.

Constructed of granite blocks, the building originally was 20 stories high. Two additional floors were built later. Offices of Myron C. Taylor, board chairman, are on the top floor.

Men of Industry

JAMES A. ROEMER, secretary and treasurer, Niles Rolling Mill Co., Niles, O., since its organization in March, 1935, has also been named vice president. A graduate of Oberlin college in 1927, Mr. Roemer worked for three years in the metallurgical laboratory, Central-Alloy Steel Co., Canton, O. In 1930 he went to the Superior Sheet Steel Co.; in 1932 he joined Sharon Steel Corp., and in 1934 became director of personnel, Youngstown Pressed Steel Co., Warren, O., which position he held until the formation of the Niles company.

R. E. Cunnick, connected with the sales department of Niles Rolling Mill Co. since its organization, has been appointed assistant general manager of sales. He has been associated with sheet steel sales since he first started to work for the Brier Hill Steel Co., Youngstown, O., in 1921.

♦ ♦ ♦

A. A. Eakins, associated with the Acme Electric Welder Co., Huntington Park, Calif., for a number of years in the Boston area, has been given charge of the entire New England territory.

♦ ♦ ♦

W. H. Borst, graduate in mechanical engineering, University of Illinois, and E. A. Webber, formerly with the Chicago office of Lincoln Electric Co., Cleveland, have been added to the company's New York sales staff.

♦ ♦ ♦

John L. Cotter, for the past five years vice president and general manager, Crittall Mfg. Co., metal casements, with headquarters in Detroit and Washington, has become secretary and treasurer for Hupp Motor Car Corp, Detroit.

♦ ♦ ♦

J. G. Eberhardt, formerly connected with Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., and Sivyer Steel Castings Co., Milwaukee, has been made assistant foundry superintendent, Kay-Brunner Steel Products Inc., Los Angeles.

♦ ♦ ♦

Harry C. Franzheim has been appointed district sales manager of the Seattle office of Wheeling Steel Corp., Wheeling, W. Va., succeeding Lyman T. Banks, resigned. He has been located at the Seattle office as assistant manager for two years and previously was located at the general offices at Wheeling.

♦ ♦ ♦

C. J. Duby, for the past six years chief engineer, Warren district, Republic Steel Corp., Cleveland, has been named chief engineer, Youngstown-Warren district. This follows the general organization plan recently inaugurated by Republic under which Youngstown and Warren have been combined into one major operating district.

E. H. Koenig, formerly chief engineer, Youngstown district, has resigned.

Joining Republic Iron & Steel Co. in 1917 as a mechanical engineer, Mr. Duby successively served as manager of the Youngstown fabricating plant; chief draftsman, Trumbull Steel Co.; assistant chief engineer, and chief engineer.

C. J. Duby

♦ ♦ ♦

George Scott has joined the sales promotion department of Ex-Cell-O Aircraft & Tool Corp., Detroit. Late in 1934 he became manager of a Detroit manufacturing company and later was its secretary and treasurer, until becoming a member of the Ex-Cell-O organization.

♦ ♦ ♦

E. J. Heffner has been appointed sales manager at Cleveland for Scully Steel Products Co., iron and steel warehouse subsidiary, United States Steel Corp. Mr. Heffner had previously for three years been a salesman for the Cleveland warehouse. For many years Mr. Heffner had been associated with the original Bourne-Fuller Co., resigning in 1917 to engage in other business.

♦ ♦ ♦

Stanley E. Chase, the past four years associated with the sales department of Gar Wood Industries Inc., Detroit, has been promoted to manager of the company's air conditioning division at Rochester, N. Y. S. T. Smith, former branch manager at Rochester, has been transferred to Boston where he succeeds E. H. Band.

♦ ♦ ♦

Deane K. Mitchell has resigned as export manager for the Niagara Sprayer & Chemical Co., Middleport, N. Y., to take a similar position with the Novo Engine Co., Lansing, Mich. He will spend much of his time abroad developing new markets for the line of machinery manufactured by Novo.

♦ ♦ ♦

Charles I. Wesley has been elected president, Wesley Steel Treating Co., Milwaukee, succeeding the late Charles Wesley Sr. Joseph F. Wesley has been made vice president, Joseph F. Husek, treasurer and Arthur H. Nuesse, secretary. These four men, together with Michael Strzeminski, comprise the board of directors.

♦ ♦ ♦

D. R. Donaldson, for the past two years factory manager, Covered Wagon Co., Mount Clemens, Mich., has been promoted to vice president in charge of manufacturing. Before joining the trailer company in 1935, he was general superintendent for Murray Corp., and before that was factory manager at the Meldrum plant, Briggs Mfg. Co.

♦ ♦ ♦

C. E. Sullivan has been appointed vice president, Foxboro Co., Foxboro, Mass., maker of industrial precision instruments. Mr. Sullivan has been affiliated with the company 26 years and has occupied the position of sales manager since 1920. He will spend the next six weeks in Europe visiting the Foxboro factory in England and distributors in other countries.

♦ ♦ ♦

W. A. Bonitz has been re-elected president, Pressed Steel Car Co. Inc., Pittsburgh. He was one of the trustees of the old company in the reorganization proceedings. Lester N. Selig, Chicago, has been re-elected chairman of the board. All other directors have been re-elected, with the exception of M. E. Stevenson who has been replaced by George D. Fleming.

♦ ♦ ♦

Frank Mooney has been appointed superintendent of the No. 2 open-hearth plant at Gary works, Carnegie-Illinois Steel Corp. He joined the company in 1924. Beginning as a handy man in the open-hearth department, he was promoted successively to cinder pit man, labor foreman, general foreman and assistant superintendent, and until recently was assistant superintendent of the bessemer and No. 3 open-hearth plant at the South works.

♦ ♦ ♦

Donald W. Frease, formerly vice president and general manager, Niles Rolling Mill Co., Niles, O.,

has joined the Reeves Mfg. Co., Dover, O., as vice president in charge of operations, a newly created position. He also has been elected a director.

Harmon Sherer, formerly chief engineer of the Niles organization, has also joined the Reeves company as chief engineer, another newly-created position.

♦ ♦ ♦

Horace S. Vaile, recently assistant to the vice president in charge of sales, United States Steel Corp., has been appointed comptroller of Marshall Field & Co., Chicago. A graduate of Purdue university, Mr. Vaile for eight years was associated with the McGraw-Hill Publishing Co., New York, before joining the Illinois Steel Co. in 1928. Later he was transferred to headquarters of the parent corporation in New York.

♦ ♦ ♦

L. J. Reay has been appointed president, Diamond Iron Works Inc., Minneapolis, and also of its subsidiary manufacturing division, the Mahr Mfg. Co. G. A. Bingenheimer, formerly president, has become chairman of the board. Other officers are: Vice president in charge of sales, W. G. Barstow; assistant to Mr. Barstow, O. E. Ertl; secretary-treasurer, W. H. Ridell; chief engineer, C. F. Olmstead. Mr. Reay previously had been treasurer for eight years of Ames-Baldwin-Wyoming Co., Parkersburg, W. Va., manufacturer of hand showels.

♦ ♦ ♦

John May, general manager of sales, American Steel & Wire Co., Cleveland, announces the following appointments effective immediately: H. M. Francis, assistant general manager of sales; V. H. Farr, assistant general manager of sales, commercial department; P. T. Coons, manager, and R. L. Rhodes, assistant, electrical, wire rope and construction materials sales; J. W. Patterson manager, and E. E. Louis assistant, merchant products sales; John Graham, manager, and R. F. Curtis, assistant, manufacturers products sales. H. A. Squibbs, Fred Connell, W. H. Jennings, assistant general managers of sales respectively at Chicago, New York, and Baltimore, will continue in their respective jurisdictions.

♦ ♦ ♦

Henry P. George, a graduate of Lehigh University in 1935, and employed in the department of metallurgy and metals research laboratory at Carnegie Institute of Technology, has been awarded a Charles A. Coffin Fellowship by the General Electric Co., Schenectady, N. Y. This is thought to be the first award granted for study in metallurgy. He will continue his work in the metals laboratory at Carnegie Tech on the problem of diffusion in metals and will undertake new work in diffusion in crystals.

William A. Johnson, also a Lehigh graduate and also affiliated with the research department of Carnegie Tech, has been awarded the Electrochemical society's prize to young authors for the year 1936 for his paper on "Studies of Overvoltage: The Effect of Fusion of the Cathode and the Effect of Temperature on Gas Polarization."

Howard E. Marshall

Well known as purchasing agent for Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., who, as noted in STEEL, March 22, p. 23, has retired from active service. Born in 1862 Mr. Marshall started with the company in 1879 as clerk in the original plant at Pemberwick, Conn.

Died:

FRANK J. FREY, 77, chairman of the board, Geuder, Paeschke & Frey Co., Milwaukee, manufacturer of tin, sheet iron and enamel ware, in that city, April 4. He had been associated with the company and its predecessor 55 years. In 1935 he was elected president, and last year was chosen chairman of the board.

♦ ♦ ♦

A. J. Welly, 50, secretary-treasurer, Seneca Wire & Mfg. Co., Fostoria, O., in Fostoria, March 11.

♦ ♦ ♦

Samuel W. Thompson, 74, president, Thompson, Weiman & Co., New York, miner and grinder of limestone, mica and other industrial materials, in that city, March 27.

♦ ♦ ♦

Oswin H. Shelly, 63, sales manager, Aetna Steel Construction Co., New York, March 26, at his home in East Orange, N. J.

♦ ♦ ♦

Thomas H. Conway Sr., 72, pioneer stove manufacturer, at his home in Detroit, March 31. He founded the Lincoln Stove & Range Co., Fremont Stove & Range Co., and Regent Stove & Mfg. Co., and at his death was president, Great Lakes Mfg. Co., Wyandotte, Mich. He retired from active business five years ago.

♦ ♦ ♦

Grant C. Deeter, 67, purchasing agent for Speer Carbon Co., and its affiliate, the International Graphite & Electrode Corp., St. Marys, Pa., in that city, March 15.

♦ ♦ ♦

R. A. Norling, 69, consulting engineer, Independent Pneumatic Tool Co., Chicago, in Aurora, Ill., March 24. He joined the company at Aurora in 1903 as an engineer and tool designer.

♦ ♦ ♦

Robert J. McKay, 73, chairman of the board, McKay Co., Pittsburgh, in Pittsburgh, March 24. He began the manufacture of chains in 1884, and later specialized in automobile tire chains.

♦ ♦ ♦

Albert J. Leo, 58, president, treasurer and director, American Petrometal Corp., New York, importer of steel, in New York, March 26. He had been in the steel business 15 years.

♦ ♦ ♦

Paul W. Dieter, 53, president, Dieter Bearings Corp. and Standard Safety Nut Corp., in New York, April 6. A native of Springfield, O., he was a pioneer in the production of locking nut devices for the railroad trade.

♦ ♦ ♦

W. P. Andrus, 70, chairman of the board, High Speed Hammer Co., Rochester, N. Y., in that city, recently. He purchased an interest in the High Speed company 18 years ago, becoming its principal owner five years later.

♦ ♦ ♦

Dr. Frederick C. Langenberg, 47, vice president in charge of research, United States Pipe & Foundry Co., Burlington, N. J., at his home in Edgewater Park, N. J., April 4. He became identified with the company in 1929.

♦ ♦ ♦

Thomas V. Blodgett, 46, sales manager, Lebanon Steel Foundry, Lebanon, Pa., in Lebanon, March 28. He became identified with Lebanon Steel Foundry in 1920 and served as chief inspector and sales engineer until 1925 when he became sales manager.

♦ ♦ ♦

George Batty, 49, steel consultant, in Philadelphia, March 20. In 1927-1928 Mr. Batty operated as a steel foundry consultant at Detroit and then became director, Steel Castings Development bureau, Philadelphia. He was active in affairs of the American Foundrymen's association.

Meetings

METALS SOCIETY CHAPTERS TO MEET IN COLUMBUS

CINCINNATI, Columbus and Dayton chapters of the American Society for Metals will hold their annual trichapter meeting at Battelle Memorial institute, Columbus, April 28. Sessions will be held morning and afternoon; a luncheon will be served at the Scioto Country club at noon.

J. P. Gill, metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa., will present a paper on "High Speed Steels" at the morning session. Papers scheduled for the afternoon session are: "Machinability of Carbon and Alloy Steel," by Henry Wysor, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.; "Free-Machining Steels—Their Metallurgy and Machining Characteristics," by J. D. Armour, chief metallurgist, Union Drawn Steel Co., Massillon, O.; "Free-Machining Aluminum Alloys," by L. W. Kempf, research metallurgist, Aluminum Co. of America, Cleveland; and "Cutting Compounds in Relation to Machinability," by D. J. Richards, district manager, E. F. Houghton & Co., Pittsburgh.

U. S. CHAMBER OF COMMERCE ARRANGES BROAD PROGRAM

Labor relations in industry, credit expansion and adequacy of inflation controls, farm tenancy and crop insurance, flood control, effects of the tax on undistributed earnings, the tariff bargaining system, price-making in distribution, and the situation in distribution, are among subjects scheduled for discussion at the annual meeting of the Chamber of Commerce of the United States to be held in Washington, April 26-29.

In connection with this meeting, the chamber will celebrate its twenty-fifth anniversary. Discussion will center largely upon governmental policies in relation to business and effects of existing and proposed legislation.

James W. Hook, president, Geometric Tool Co., New Haven, Conn.; B. C. Heacock, president, Caterpillar Tractor Co., Peoria, Ill.; and H. L. Ferguson, president, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., speak at a session on management relations with employes.

HARDWARE MAKERS ARRANGE MEETING IN NEW ORLEANS

Seventy-fourth semianual convention of the American Hardware Manufacturers association will be held at Hotel Roosevelt, New Orleans, April 19-22, simultaneously with the forty-seventh annual convention of the Southern Hardware Jobbers association. Many of the sessions will be held jointly.

Addresses scheduled for the meeting include: "Some Problems of Distribution by M. J. Lacey, president, Peck, Stowe & Wilcox Co.; Southington, Conn.; "Distribution," by Shannon Crandall, president, California, Hardware Co., Los Angeles, and president, National Wholesale Hardware association; and "Federal Legislation Affecting Business," by H. P. Fowler, Chamber of Commerce of the United States, Washington.

SPRING MANUFACTURERS TO CONDUCT ANNUAL MEETING

Fifth annual meeting of the Spring Manufacturers association will be held at Hotel Commodore, New York, April 22. L. A. Wheeler, Box 548, Bristol, Conn., is secretary.

TO PRESENT WELDING PAPER AT S.A.E. TRACTOR MEETING

Problems connected with the design, manufacture, operation and uses of tractors will be considered by the Society of Automotive Engineers at a meeting at Hotel Pere Marquette, Peoria. Ill., April 21-23. "Resistance Electric Welding is the subject of a paper to be presented by E. A. Mallett, Taylor-Winfield Corp., Warren, O.

METAL TRADES ASSOCIATION CONVENTION IN CHICAGO

National Metal Trades association announces its thirty-ninth annual meeting in Chicago, May 27-28. Headquarters will be at the Palmer House. H. S. Flynn, 122 South Michigan avenue, Chicago, is secretary.

MICHIGAN COLLEGE TO HOLD ENGINEERING EXHIBIT

Michigan College of Mining and Technology, Houghton, Mich., will hold its annual engineering show May 13-15. Special displays will be arranged by all engineering departments.

Convention Calendar

April 12-15—American Chemical society. Ninety-third meeting at University of North Carolina, Chapel Hill, N. C. Dr. Charles L. Parsons, 728 Mills building, Washington, is secretary.

April 15—National Council of American Shipbuilders. Annual convention at Whitehall club, New York. C. C. Knerr, 11 Broadway, New York, is secretary.

April 19-22—American Hardware Manufacturer's association. Semiannual convention at Roosevelt hotel, New Orleans. Charles F. Rockwell, 342 Madison avenue, New York, is secretary.

April 19-24—International Association for Testing Materials. Second international congress in London. K. Headlam-Morley, 28 Victoria street, London S.W. 1, is honorary secretary.

April 21-22—American Management association. Eleventh annual conference of production division at Palmer House, Chicago. Alvin E. Dodd, 330 West Forty-second street, New York, is president.

April 22—Spring Manufacturers association. Fifth annual meeting at Hotel Commodore, New York. L. A. Wheeler, Box 548, Bristol, Conn., is secretary.

April 26-27—American Zinc institute. Nineteenth annual meeting at Hotel Statler, St. Louis. Ernest V. Gent, 60 East Forty-second street, New York, is secretary.

April 26-28 — Galvanizers Committee. Second meeting at Hotel Statler, St. Louis. Ernest V. Gent, 60 East Forty-second street, New York, is secretary.

April 26-29—Chamber of Commerce of the United States. Twenty-fifth annual meeting in Washington. D. A. Skinner, 1615 H street, Washington, is secretary.

April 28—American Society for Metals. Annual trichapter meeting of Cincinnati, Columbus and Dayton chapters at Battelle Memorial institute, Columbus, O. E. C. Stein, Columbus Auto Parts Co., Columbus, O., is secretary of the Columbus chapter.

April 28-29—Association of Iron and Steel Engineers. Spring engineering conference at Hotel Statler, Buffalo. Brent Wiley, 1010 Empire building, Pittsburgh, is managing director.

April 30-May 1—Concrete Reinforcing Steel institute. Thirteenth annual meeting at Homestead hotel, Hot Springs, Va. William S. Thomson, 201 North Wells street, Chicago, is secretary.

May 3-7—American Foundrymen's association. Forty-first annual convention and exposition at Milwaukee Auditorium, Milwaukee. C. E. Hoyt, 222 West Adams street, Chicago, is executive vice president.

May 4-9—Society of Automotive Engineers. Summer meeting at the Greenbrier, White Sulphur Springs, W. Va. John A. C. Warner, 29 West Thirty-ninth street, New York, is secretary and general manager.

May 5-6—National Association of Sheet **Metal Distributors.** Twenty-sixth annual meeting at Hotel Cleveland, Cleveland. George A. Fernley, 505 Arch street, Philadelphia, is secretary.

May 10-12—Southern Supply and Machinery Distributors' association. Annual convention at Hotel Peabody, Memphis, Tenn. Alvin M. Smith, Smith-Courtney Co., Richmond, Va., is secretary.

May 10-12—American Supply and Machinery Manufacturers' association. Annual convention at Peabody hotel, Memphis, Tenn. R. Kennedy Hanson, 1108 Clark building, Pittsburgh, is secretary-manager.

May 10-12—National Supply and Machinery Distributors association. Annual convention at Peabody hotel, Memphis, Tenn. H. R. Rinehart, 505 Arch street, Philadelphia, is secretary.

May 12-13—Refrigerating machinery association. Spring meeting at the Homestead, Hot Springs, Va. William B. Henderson, Southern building, Washington, is executive vice president.

May 16-21—National Electrical Manufacturers association. Spring conference at the Homestead, Hot Springs, Va. W. J. Donald, 155 East Forty-fourth street, New York, is managing director.

May 17-21—American Society of Mechanical Engineers. Semiannual meeting at Statler hotel, Detroit. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

May 17-21—American Mining congress. Fourteenth annual coal convention and exposition at Music Hall, Cincinnati. Julian D. Conover, Munsey building, Washington, is secretary.

Activities of Steel Users and Makers

CLEVELAND CRANE & ENGINEERING CO., Wickliffe, O., has booked an order for a 60-ton electric overhead traveling crane for the California Institute of Technology, Pasadena, Calif., to be mounted in the dome of the 200-inch telescope building for handling the delicate parts of the world's largest telescope. The crane will be of all-welded steel construction. A 5-ton auxiliary hoist also will be provided for fast handling of small loads.

♦ ♦ ♦

C. Tennant, Sons & Co., New York, has moved its offices to 9 Rockefeller Plaza.

♦ ♦ ♦

Tabor Mfg. Co., Philadelphia, has established a southern agency at Chattanooga, Tenn., in charge of H. H. Reich, 258 Glenwood drive.

♦ ♦ ♦

Henry & Allen Inc., Auburn, N. Y., have started manufacturing advertising display stands from light steel angles and strip steel.

♦ ♦ ♦

Acer & Whedon Inc., Medina, N. Y., manufacturer of furnace pipe and fittings, now is producing a standardized line of air conditioning pipe and fittings.

♦ ♦ ♦

Frank Samuel & Co. Inc., Philadelphia, has moved its New York offices from 26 John street to 40 Exchange place. H. P. Banks is New York manager.

♦ ♦ ♦

Ball & Jewell, 22-28 Franklin street, Brooklyn, N. Y., have developed a new type of patented rotary cutter designed particularly for use in the plastic industries.

♦ ♦ ♦

American Gas Machine Co. Inc., Albert Lea, Minn., recently developed and placed in production stoves for trailers. It is now bringing out a complete line of newly designed oil burning heaters.

♦ ♦ ♦

International Harvester Co. has established a factory sales and service branch of its motor truck division at 215 University avenue, St. Paul. E. E. Burke is branch manager and F. R. Corcoran, assistant manager.

♦ ♦ ♦

Lloyd B. Edwards Co., 840 Lumber Exchange building, Minneapolis, organized by Lloyd B. Edwards, has been appointed sales representative for the Harnischfeger Corp., Milwaukee, for its line of overhead cranes, hoists and motors.

♦ ♦ ♦

Norma-Hoffmann Bearings Corp., Stamford, Conn., has removed its Pittsburgh office from 105 Fahnestock road to room 722 Gulf building. A. A. Van Pelt continues in charge, as manager for the Pittsburgh territory.

♦ ♦ ♦

Kay-Brunner Steel Products Inc., Los Angeles, has completed a 30 x 150 foot addition to its plant at Alhambra, Calif., which will house the squeezer molding department. A 90-foot addition to the cleaning room also is under construction.

♦ ♦ ♦

American Steel Wool Mfg. Co. Inc., 42-24 Orchard street, Long Island City, N. Y., has placed on the market a new product known as rope steel wool, specifically for use in cleaning and surfacing floors. The wool may be coiled into pads for any type floor machine.

♦ ♦ ♦

Simplex Engineering Co., Washington, Pa., has announced that as a matter of corporate convenience, its business in all states will hereafter be conducted under the name of Frazier-Simplex Inc., without change in ownership, management or policies.

♦ ♦ ♦

Congdon & Carpenter Co., Providence, R. I., steel warehouse distributor, for 65 years operating a branch plant at Fall River, Mass., will build a new warehouse in the latter city, enlarging its jobbing service in southeastern Massachusetts and Cape Cod. Arthur L. O'Keefe is manager at the Fall River plant.

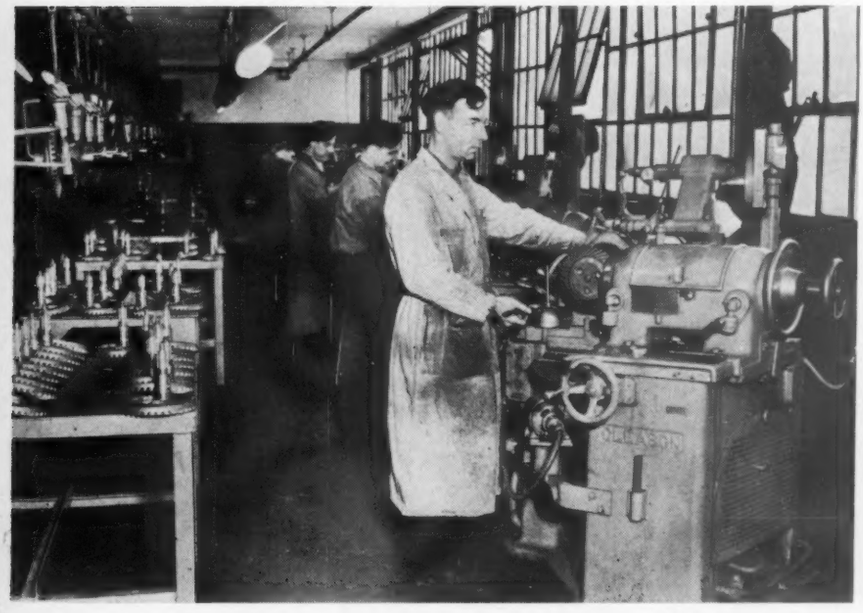
♦ ♦ ♦

Baker Ice Machine Co., Omaha, has developed several new units for all kinds of refrigerating, cold storage and sharp freezing work, replacing the old style bunker coil system formerly used for such purposes. In addition, the company has a new unit for quick cooling of water in large quantities. Copper bearing steel is used in their construction, and much of this is given a rustproofing treatment. The company also has developed several new condensing units which consist of new Freon type compressors, shell and tube condensers and welded steel bases.

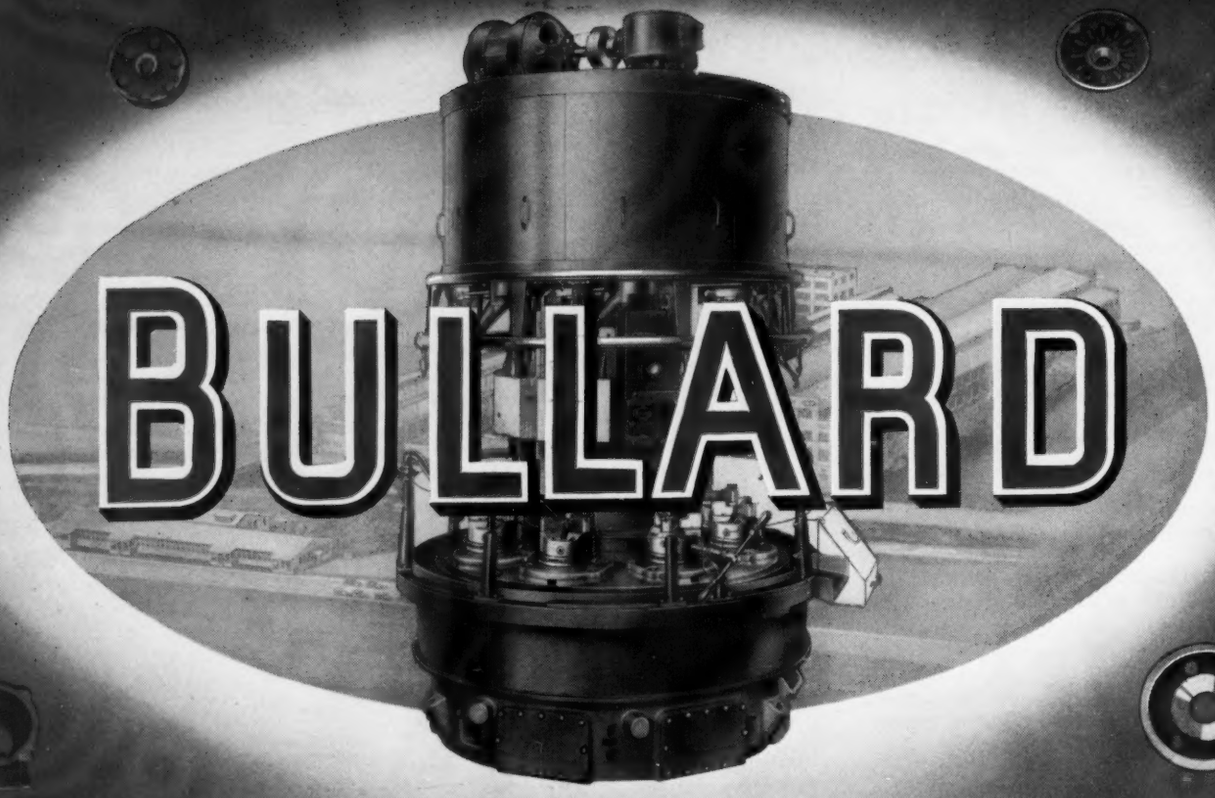
♦ ♦ ♦

All axles, including the driving axles, on the 50 new 4-6-4 steam locomotives now being built for the New York Central railroad by the American Locomotive Co. will be equipped with tapered roller bearings to be furnished by Timken Roller Bearing Co., Canton, O. To decrease the hammer blow, all locomotives will be equipped with light-weight reciprocating parts developed by Timken, and five will also have Timken light-weight, forged and heat treated main and side rods operating on tapered roller bearings on the crank pins and cross heads.

Puts O.K. on Hypoids



FINAL inspection and matching of hypoid axle gear sets is accomplished at the Buick plant in Flint, Mich., on this battery of Gleason testing machines with offset axles to accommodate the gears. Expenditure of $300,000 was made for equipment to rough, finish, lap, clean and test pinions and ring gears for hypoid axles. Gear sets are received for testing on the overhead conveyor at the left



BULLARD

PROVED PROFIT-BUILDERS

Every job illustrated here was more Profitably machined on the Bullard Mult-Au-Matics than by the Best previous method.

New jobs and redesigned old jobs are continually coming up for tooling and improved methods of manufacture. In each instance, the use of Bullard Mult-Au-Matics affords an opportunity for cost reductions.

Long experience over a Wide field of Service enables Bullard Engineers via the Mult-Au-Matic Method to assist in solving many of your cost reduction problems.

Let us make estimates on your Problem Jobs.

MULT·AU·MATICS

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

MIRRORS OF MOTORDOM

DETROIT

GENEROUS application of diplomatic oil to the troubled waters of automobile labor meant the return of 65,000 Chrysler workers to their posts last week, and the formulation of a pattern which is counted to iron out further sitdown strikes which may develop in the industry. Cessation of Chrysler production from March 8 to April 7 cost workers close to $9,000,000 and the corporation some $6,000,000.

The agreement which Walter P. Chrysler signed with the UAW comprises ten points, significant features being the promise of the UAW not to authorize any further strikes for one year, and agreement of the corporation not to "aid, promote or finance any labor group or organization which purports to engage in collective bargaining or make any agreement with any such group or organization for the purpose of undermining the union."

Both Sides Save Face

Union leaders contended this meant they had achieved sole collective bargaining; B. E. Hutchinson of Chrysler held it meant no such thing, that the corporation was free to make agreements with other groups, providing they did not "undermine" the UAW. You can take your choice, but the moot questions are: Will conflicting interpretations of this point result in further halts in production by sitdown strikes, and has the UAW the power to enforce terms of the agreement among its members?

General Motors, with about 35 sitdown strikes on its hands since its agreement with the UAW, is beginning to question the ability of the union to assume responsibility for its members. Recently brief sitdowns occurred in the Saginaw steering gear division and in the Olds plant at Lansing. They were settled quickly, but continuation of these petty disturbances is seriously taxing the smooth operation of plants.

It develops now the Olds sitdown early last week was engineered just as a joke by the day shift which completed work 10 minutes ahead of quitting time and "sat down" at machines. The "joke," company officials pointed out, meant a loss of $30,000 in wages to 4500 on the night shift who missed a night's work.

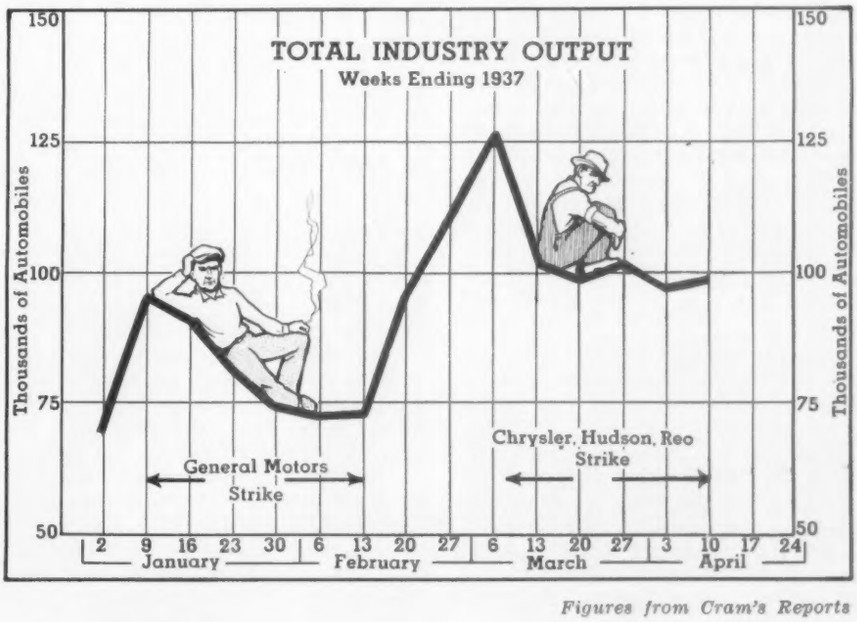
Reports of labor difficulties in other GM plants continue to filter out, one being to the effect the UAW is seeking to establish one shop steward for every 20 men, said steward to be on the company payroll. Considerable conflict develops over the shop steward system set up by the union, an arrangement which is mentioned nowhere in the GM-UAW agreement, the latter confining representation to shop committees. Considerable talk is heard of deliberate slowing down by union workers, and of the inability of foremen to exercise control over their men.

One recent sitdown at Pontiac was said to have been started in protest over the company's firing a union plant policeman who came to work intoxicated.

The Chrysler settlement, announced late Tuesday night, was surprising in view of the fact early in the afternoon the conference was on the point of breaking up because of failure to get anywhere near an agreement. The word "undermine," mentioned previously, probably was the key which unlocked the situation and paved the way for signing of the agreement. Governor Murphy was sweating plenty that afternoon trying to keep the conferees together.

So, for the moment, Detroit is breathing easier as the car production curve resumes its upward slant. Resumption of Chrysler, Hudson and Reo may help to reverse the mounting relief load in Wayne county, and may ease the pressure on courts for eviction orders against families unable to pay rent. In one

Sitting Down on the Trend Line



Figures from Cram's Reports

MIRRORS OF MOTORDOM

recent week, 300 of these orders were issued.

According to state troopers, Chrysler plants were left in good condition by evacuating sitdown strikers. This, of course, is just a superficial observation, and the true extent of any damage is not yet known. At one plant, acid was dumped out of batteries and carried to the roof in wood buckets, ready to be poured down on several hundred new cars waiting shipment outside the plant; this in case any attempt was made to drive strikers from the plant. Damage to plants in the General Motors strike has been variously estimated, one figure being $125,000.

SECOND-GUESSERS are busy explaining whirlwind adjustment of the sitdown strike in Ford's Kansas City assembly plant. Five Ford executives, identity withheld from the public, flew to the scene of the disturbance and 30 hours after the strike began a settlement was reached. One explanation goes to the effect the Ford contingent, headed by Harry Bennett, whose "connections" are countless, immediately contacted Tom Pendergrast, boss of the Kansas City political machine, and made a deal which resulted in the plant's evacuation and subsequent resumption.

Henry Ford again broke into the headlines last week by declaring his company would never recognize the UAW or any other union, and would continue its policy of "escorting" sitdowners to the gates, at the same time holding no grudge against union members, whom he considered as "duped and coerced by strike leaders." This made choice fodder for John L. Lewis' pep talk at State Fair Grounds Wednesday night and Lewis let fly a few paragraphs of his choicest sarcasm in Mr. Ford's direction.

Thus far the vast Rouge plant has been practically impregnable against would-be sitdowners, as evidenced by an unvarying high rate of production from week to week. Total for last week was 34,850, a difference of only 50 from the week previous. Of this total, 850 were Lincoln Zephyrs to apply on what a Ford official is credited with terming a bank of 12,000 unfilled orders. Sales of Zephyrs in March totaled 3026, highest monthly figure ever attained.

Ford, incidentally, is working toward building up a bank of parts for 30 days' requirements, but as yet has not had much success in achieving this "float," supply of some parts being sufficient for only five or six days' production of cars.

The new consolidated tool and die shop at the Rouge plant, for which figures have been taken on a number of machine tools, will be located in a new building, requiring a reported 2400 tons of structural shapes.

Automobile Production

Passenger Cars and Trucks—United States and Canada
By Department of Commerce

	1935	1936	1937
Jan.	300,335	377,306	399,426
Feb.	350,346	300,874	383,637
2 Mos.	650,681	678,180	783,063
March	447,894	438,992	*490,000
April	477,059	527,726	.....
May	381,809	480,571	.....
June	372,085	469,355	.....
July	345,297	451,474	.....
Aug.	245,075	275,951	.....
Sept.	92,728	139,785	.....
Oct.	280,316	229,989	.....
Nov.	408,550	405,702	.....
Dec.	418,317	519,132	.....
Year	4,119,811	4,616,857	.....

*Estimated.

Calculated by *Cram's Reports*

Week ended:	
March 13	101,684
March 20	99,013
March 27	†101,046
April 3	†97,005
April 10	98,910

†Revised.

SEVERAL new plant projects in General Motors divisions are in process of being tooled up; by this is meant that inquiries are being issued for the necessary machinery, in view of the extended delivery periods now in effect for most tools. In planning a new manufacturing setup these days, the first step is usually toward lining up the equipment, deferring such "minor" details as plant location, size and arrangement until later.

Ternstedt, hardware division of GM, for example is issuing inquiries for machine tools for a new plant to be located outside the state of Michigan. This is in line with the General Motors policy of decentralizing manufacturing operations to get away from congestion and its attendant evils in the immediate Detroit district.

Another new GM project, one which has been discussed generally for some time, is a diesel engine plant to supply motors for trucks and buses built by Yellow Truck & Coach. Estimates on equipment for such a plant, to build three sizes of diesels, are being taken at the Cadillac plant now, it is understood. Best opinion seems to be the new division will be located somewhere on the west side of Detroit.

A considerable volume of equipment also will be required for the new Chevrolet motor and axle plant at Tonawanda, N. Y., mentioned in these columns last week. This project, too, is active at the moment.

Packard continues to be a persistent buyer of machine tools, although not in any large numbers. The equipment is chiefly to plug up suspected weak spots in manufacturing and to round out production facilities.

LATE revision of production figures for the week ending April 3 was necessary because of brief sitdowns in scattered General Motors plants. New total is placed at 97,005. Last week, as these differences were adjusted, output gained about 1900 units to 98,910. Chrysler, of course, was still out of the picture; General Motors accounted for 51,080, and Ford 34,850.

Greatest first quarter production in the history of the industry was achieved, despite sitdowns and other difficulties. Estimates place the three-month total at 1,290,800. Of the "big three," Ford was on top with 419,400, a gain of almost 45 per cent over the corresponding period of last year.

Aggregate production of the so-called independent companies for the first quarter amounted to slightly over 184,000 cars, a 55 per cent improvement over last year. Much of this gain was contributed by Packard, which more than doubled its 1936 showing. Willys more than sextupled its first quarter output of last year.

RESULTS of last Monday's election, especially in Genessee, Saginaw, Oakland and Ingham counties, are being interpreted as a rebuke to the state and national administrations for their failure to deal firmly with the illegal seizure of General Motors plants in Flint. Last fall these counties went Democratic by strong majorities while last week

(*Please turn to Page* 122)

WINDOWS OF WASHINGTON

WASHINGTON

IRON and steel scrap was front page news in Washington last week. This was due, of course, to the bill of Senator Schwellenbach, Washington, which would prohibit scrap exportations except by licenses issued by the President.

It appears certain if things continue the way they are going now that there will be a wide discussion. Some steel interests have employed Louis J. Brann, former governor of Maine, to handle their case in Washington while the scrap people have not yet decided whether they will employ someone to represent them here or whether Benjamin Schwartz, director-general of the Scrap Iron and Steel institute, will come to Washington for the duration of the struggle.

Scrap Dealers Oppose Bill

It is reported that Senator Schwellenbach and other members of the senate are already receiving backfires from the scrap dealers at home protesting against the proposed embargo. In the meantime apparently, Schwellenbach has not yet decided whether he wants to ride along with his bill or not. Much depends upon the report of an investigation now being made. His office still insists that the bill was introduced at the request of foundry interests of his state, who complained against scarcity and high price of scrap.

The bill has been referred to the executive committee on commercial policies, which was originated by the President some two or three years ago to co-ordinate commercial policies. The department of commerce is represented on that committee by Assistant Secretary Draper and Alexander V. Dye, director of the bureau of foreign and domestic commerce. Other departments represented on the committee include, state and agriculture and the tariff commission. Dr. Herbert O. Feis, economic adviser of the state department, is one of the leading figures and he is now making a study of the advisability of the legislative conservation of scrap. It is expected that a report will be made shortly.

Senator Schwellenbach said last week that he had introduced the bill because of a "flood of complaints" which he had received from foundrymen in his home state.

"Whether I support the bill actively or oppose it," he said, "will depend on the committee's report. The foundries claim there is a shortage, causing exorbitant prices, but the scrap iron dealers contend the supply is ample and the price reasonable."

There are other angles, one being that the army and navy may be interested in favoring export restrictions and there are some who feel that this bill, which is purely class legislation, will not have any chance of passage unless it is put on a strictly national defense basis.

It is felt also that the foreign trade program may be mixed up in the matter because Secretary Hull does not want embargoes placed on anything that might interfere with his commercial program.

In this connection it must be borne in mind that he is now trying to make a trade agreement with England and that country is now purchasing a large amount of scrap from this country. He does not want anything done that would cut England off from this scrap if it wants it, in view of the effort being made for the agreement. These are only a few of the complications connected with the problem of scrap.

TIN PLATE SCRAP EXPORT BILL BEING AMENDED

With practically no debate the house last week passed the bill H. R. 5408 which amends the tin plate scrap embargo act by allowing its export to Hawaii, Puerto Rico and other places subject to the jurisdiction of the United States.

Asked for an explanation of the bill, Representative Faddis, Pennsylvania, who introduced it, stated that it "is simply an amendment to a bill passed two years ago because the national munitions control board is in doubt whether the provisions of the original bill allowed them to prohibit the exportation of this scrap to some of the insular possessions of the United States. In other words, it is a bill requested by the national munitions control board so that this scrap may be lawfully exported to Hawaii, Puerto Rico, and other places." The bill as it was enacted by the house and as it has now gone to the senate for action, is as follows:

"That the act approved Feb. 15, 1936, entitled 'An act to provide for the protection and preservation of domestic sources of tin' be, and the same is hereby, amended by adding thereto a new section, to be numbered 4, which shall read as follows:

" 'Sec. 4. The term United States as used in this act shall include all territories subject to the jurisdiction of the United States, except the Panama Canal, and the Commonwealth of the Philippine Islands. For the purposes of this act, the commonwealth of the Philippine Islands shall be considered to be a foreign country.' "

COLLUSIVE STEEL BIDDING REPORT NEAR COMPLETION

The collusive steel bidding investigation being made by the department of justice is getting warmer. At a White House press conference last week the President was asked what he had heard about this matter. He turned to one of the members of his secretariat and asked that a check be made on it.

The following day, at a press conference with Attorney General Cummings, the latter was asked what progress was being made in the case. Mr. Cummings stated that he hoped to make a report to the President on the subject in the next two or three weeks.

No mention was made during the

discussion of the filing of any court charges but Cummings stated that if any action were suggested it would be incorporated in the report itself. There is every indication at the justice department that not enough information has been obtained to justify going into court.

It is understood on good authority that the attorney general has had a couple of informal discussions with the President on this subject.

During the course of a discussion at the press conference the attorney general stated that the FBI had been called into this case and that its investigators had interviewed 149 witnesses. In justifying the time which has been taken on this report, Mr. Cummings said that various government departments had made reports on collusive bidding and also his department had to go into allied subjects. He said also that the basing point question was gone into and its connection with the NRA code. He then proceeded to discuss the difficulty which the department is having in trying to enforce antitrust laws in view of court decisions. He called attention also, in justifying the delay in the report, to the fact that the antitrust division has changed hands from Assistant Attorney General Dickinson to Jackson. He said that about a month ago he had put this on his agenda to clean up within the month but the court reorganization plan had upset all of these calculations. He said, however, that he expects to be able to make the report to the President within the next two or three weeks.

SIT DOWN STRIKES FIND FRIENDS IN CONGRESS

The sit down strike situation continued to attract members of congress on both sides of the Capitol last week. An important movement was action of the rules committee of the house in reporting out a resolution of Representative Dies, Texas, for investigation of such strikes by a select committee to be appointed by the speaker of the house.

After many "whereases" the resolution provides for appointment by the speaker of a special committee of seven members of the house, not more than five of whom shall be of any one political party.

The committee is to investigate "(1) the cause or causes producing such 'sit down' strikes; (2) the truth as to actual conduct of all parties to such strike, including the management and those acting under the management, as well as those who take part in the strike; (3) upon whose advice and instigation such 'sit down' strikes were called and carried on; (4) the true condition in the affected industries in reference to wages, hours of work, and other conditions under which the employes are compelled to work; (5) the charges that the management of such affected industries have employed agents to perpetrate violence upon their employes; (6) the efforts made by the local and state authorities to prevent such 'sit down' strikes; (7) and all other charges which have been made or will be made by the representatives of labor on the one hand and the management of industry on the other, so that a full, complete, and impartial finding of facts may be had; (8) and all other questions in relation thereto that would assist Congress in the immediate enactment of necessary remedial legislation."

The resolution calls for the cooperation of the departments of labor and justice, including access to files, etc.

Sees Threat to Labor

In the meantime Representative Teigan, a farm labor representative from Minnesota, has opposed such a resolution because he says that "it is perfectly clear that this resolution would permit, under the cloak of a congressional investigation, a reactionary expedition against unionism."

Apropos of this whole situation Representative Bernard, Minnesota, also took up the cudgels for the workers in the sit down strike situation in which he said that under cover of concern for property rights the public is losing sight of the fact that the investment of workers is their daily work and that by this work all the good things of life are produced. It came out during the course of his talk that: "I should say at the outset that I am proud to be a member of the International Union of Mine, Mill and Smelters Workers, affiliated with the CIO, which is the most progressive national force in America today."

Then on the other side of the capitol Senator Wagner, New York, charged that it is the "greed of monopoly capital" which is mainly responsible for the strikes which are filling the papers with news these days.

The sit down strikes were provoked, Senator Wagner said, "by the long standing ruthless tactics of a few great corporations."

ROPER ASKS MORE FUNDS

Secretary of Commerce Roper, his assistant, Ernest Draper, and other officials of the commerce department appeared last week before the appropriation committee of the senate in connection with money for the fiscal year beginning July 1.

Mr. Roper and his helpers asked that the bureau of foreign and domestic commerce be allowed by congress what the budget bureau had allowed them. This would increase the present appropriation allowed by the house by some $70,000.

MAJOR BERRY STILL THORN IN ADMINISTRATION SIDE

Some wonderment has been expressed recently because no one has heard anything about the co-ordinator for industrial co-operation, Major George L. Berry. The major is busy on many other matters, the most important of which is trying to create sentiment in favor of the Roosevelt plan for revising the judicial system.

It may be recalled that Major Berry called a meeting of his organization shortly before Congress convened to draw up a labor and industrial program for presentation to the President. Stories kept coming out from his trained publicity bureau that the report would go to the President "any day now." That has been some months ago and nothing further has been heard from this program.

Even at the time, there was behind the scenes talk that the President was much embarrassed by the situation but that he could do nothing about it because both Major Berry and CIO Lewis were mixed up in the council and it came into existence by executive order which has never been rescinded.

In the meantime it is apparent that Major Berry is putting most of his time on the work of the so-called labor nonpartisan league under the guise of which he is operating. If the industrial council is doing anything it is certainly hiding its light under a bushel.

Roper Council Is Busy

Relative to this question of industrial committees, the Roper business advisory council met here last week in one of its regular monthly meetings. This council is not spectacular in any sense of the word but it keeps plugging along and some day will be recognized for what it is worth. Edward Stettinius attended the conference, representing the iron and steel industry, and equally prominent men were present from many other important industries.

They discussed hours and wages and the sit down strike and other important matters that would naturally come to the minds of industrialists. They had been asked by the President for a report on hours and wages but it is understood that nothing concrete has yet been developed and it is very doubtful if any out-and-out report will be made by that body.

Editorial

Skimping on Durable Goods Perpetuates Relief Problem

WHEN President Roosevelt at a recent press conference told newspapermen that on account of the "high" prices of steel and copper he had decided to curtail government purchases from the durable goods industries, he was again displaying his curious belief that the federal government, through its chief executive, has been given sanction to control the economic forces of the nation.

Judging from numerous events of the past four years, the President and some of his advisers take the idea of a planned economy seriously. Sometimes they act as if the natural laws of supply and demand had been suspended for the duration of the new deal, and that in the meantime such factors as prices, inventories, production, interest rates, etc. can be controlled from Washington.

It is true, of course, that under the unusual powers granted to the President in the urgency of the depression, the federal government can and does exert a tremendous influence upon social and economic trends. However, natural laws have not been suspended, nor have we approached anything like a planned economy. Instead we have a confused medley of government influences—many of them contradictory within themselves—and some of them working at cross purposes with more powerful natural tendencies. The factors affecting our national affairs are so complicated and spring from so many sources that it is impossible for any centralized authority—short of an absolute dictatorship—to exercise more than a feeble measure of guidance and control.

Influence of Government Purchases of Durable Goods Is Slight When General Demand Is Brisk

So when the President talks about easing up on pump priming in the durable goods industries, he probably thinks that this action not only will remove the governmental stimulus to these industries but also will serve to check the upward spiraling in the prices of their products. As a matter of fact, such action will have only slight effect. This is because government purchases are of little moment when general demand is as brisk as at present, and secondly, because the prices of which the President complains, are largely the result of forces set in motion by the government either to increase wages or prices, and, in the case of copper, of world-wide influences over which neither the government nor domestic producers can exercise effective control.

The President's utterance also must be considered from the angle of relief. When inveighing against the price advances of copper and steel, he was thinking of the continued need of relief work under WPA or PWA. In deciding that in the future preference in relief projects should be shown to the consumer goods industries, he was reverting again to this familiar stand that as much of the relief money as possible be put into unskilled workers' wages and as little as can be into materials—especially durable goods.

The inevitable result of this policy will be to perpetuate a large army of unemployed, regardless of the degree of prosperity enjoyed by the durable goods industries. As long as the federal government insists upon thinking up leaf raking, roadside beautification and similar rake, hoe and shovel projects to occupy the unskilled unemployed, it will be increasingly difficult to shift these unfortunate persons onto private payrolls.

Continuance of Made Work for Manual Labor Tends To Perpetuate Army of Unemployed

Also the nature of relief work should be considered in the light of usefulness to the public. In thousands of localities throughout the country one will find evidence of elaborate rake and shovel work—representing improvements of temporary and sometimes doubtful value—within a few hundred yards of a dangerous grade crossing or of a one-way, antiquated narrow bridge on a four-lane, high speed, heavily traveled motor highway. Obviously the public welfare would be benefitted more by eliminating the dangerous crossing or by replacing the death-trap bridge than by repeating the nearby rake and shovel job year after year.

More important, however, is the effect upon the unfortunate men on relief. As long as they remain employes of the government, they have no incentive to improve their position. But if a government-financed job were introduced into their locality and it were executed by private contractors, some of the more enterprising of the unemployed would seek private employment. At the same time the use of cement, sand, gravel, steel, creosoted timber, lumber, nails, bolts, etc. would afford greater opportunities for private jobs in established employment channels. Multiply this situation by thousands, and one can envision a partial solution of the unemployment problem.

Drive a few hundred miles over important U. S. highways and you will be convinced the government is unnecessarily perpetuating relief work because it prefers not to buy durable goods. The President's decision to keep the government out of the heavy industries' markets will not harm those industries as much as it will intensify and complicate the already critical problem of unemployment.

STEEL'S INDEX OF ACTIVITY
In Iron, Steel and Metal working Industries
Based upon freight car loadings, electric power output, automobile assemblies (Cram's Reports) and steelworks operating rate (STEEL). Average for 1926 equals 100, weighted as follows: Steel rate 40, and carloadings, power output and auto assemblies each 20
1937
1936
Per Cent
1929 1930 1931 1932 1933 1934 1935
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
STEEL

STEEL'S index of activity declind 1.9 points to 112.3 in the week ending April 3:

Week ending	1937	1936	1935	1934	1933	1932	1931	1030
Feb. 20	108.8	81.8	80.5	75.5	46.0	54.5	76.0	97.7
Feb. 27	112.8	83.4	81.1	76.8	47.4	55.1	75.8	99.7
March 6	117.9	87.7	82.0	78.6	43.4	54.1	79.2	93.8
March 13	112.7	89.7	84.0	79.9	42.7	54.8	80.6	97.5
March 20	113.1	86.0	84.0	79.7	44.6	54.4	81.3	98.1
March 27	114.2†	91.2	84.3	79.3	45.2	53.5	80.6	99.6
April 3	112.3*	96.8	83.4	79.6	49.1	53.4	81.5	97.6

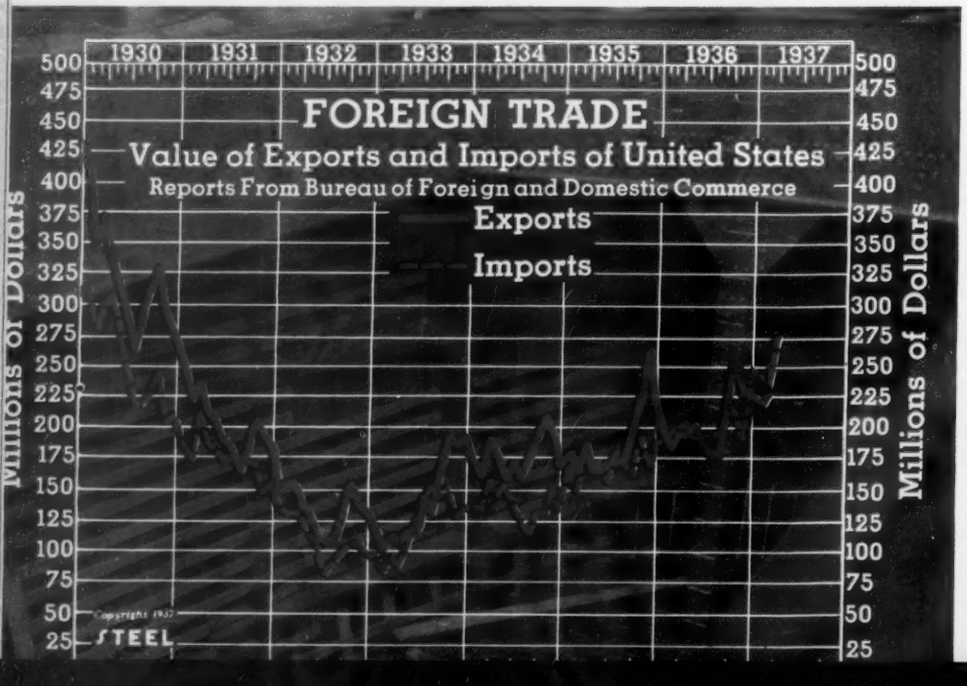
*Preliminary. †Revised.

Steel Rate Resists Easier Trend in Activity Index

ACTIVITY in the iron, steel and metalworking industries eased off slightly in the week ending April 3. STEEL's index stands at 112.3 compared with 114.2 in the week ending March 27.

This slight recession of 1.9 points is due to a moderate downward movement in electric power output and freight car loadings, together with the production-curbing labor difficulties in motordom which cut the weekly output of automobiles from 101,805 to 97,005 cars in the week ending April 3. Electric power output in the week ending April 3 declined from 2,200,-143,000 kilowatt-hours to 2,146,959,000, the lowest point recorded this year with the exception of the first week in January which included a holiday. However, the current production rate remains 15 per cent above the corresponding week a year ago. Freight car loadings are expected to drop close to the 741,000-mark, a loss of approximately 20,000 cars. Due to the two-day interruption in the coal mines last week most of the coal carrying roads registered slight losses.

The one remaining key barometer to resist this downward trend was steelworks operations, which advanced 1.5 points to 91.5 per cent of capacity. According to STEEL's compilation, this was the highest percentage touched since the week ending Aug. 17, 1929.


1930 1931 1932 1933 1934 1935 1936 1937
FOREIGN TRADE
Value of Exports and Imports of United States
Reports From Bureau of Foreign and Domestic Commerce
Exports
Imports
Millions of Dollars
STEEL

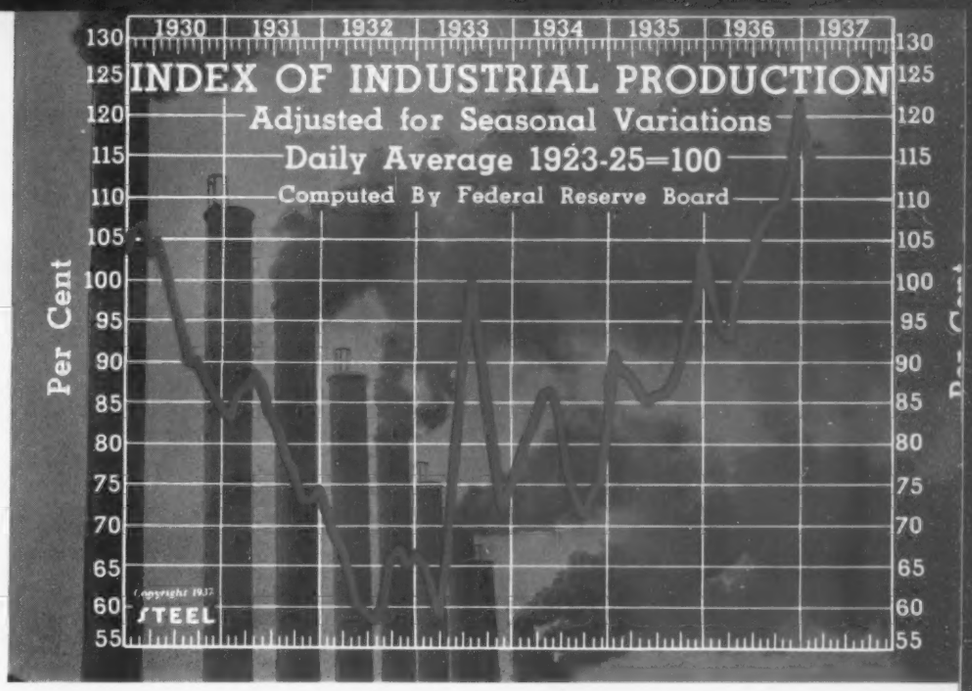
Dollars (000 omitted)

	1937		1936	
	Exports	Imports	Exports	Imports
Jan.	221,550	240,396	198,654	187,482
Feb.	232,504	277,805	182,024	192,774
March	.....	.....	194,790	198,686
April	.....	.....	193,490	202,437
May	.....	.....	201,042	191,110
June	.....	.....	185,188	192,233
July	.....	.....	178,324	193,409
Aug.	.....	.....	178,249	195,016
Sept.	.....	.....	219,976	215,525
Oct.	.....	.....	264,708	212,001
Nov.	.....	.....	225,766	196,423
Dec.	.....	.....	229,739	244,321

BUSINESS TREND

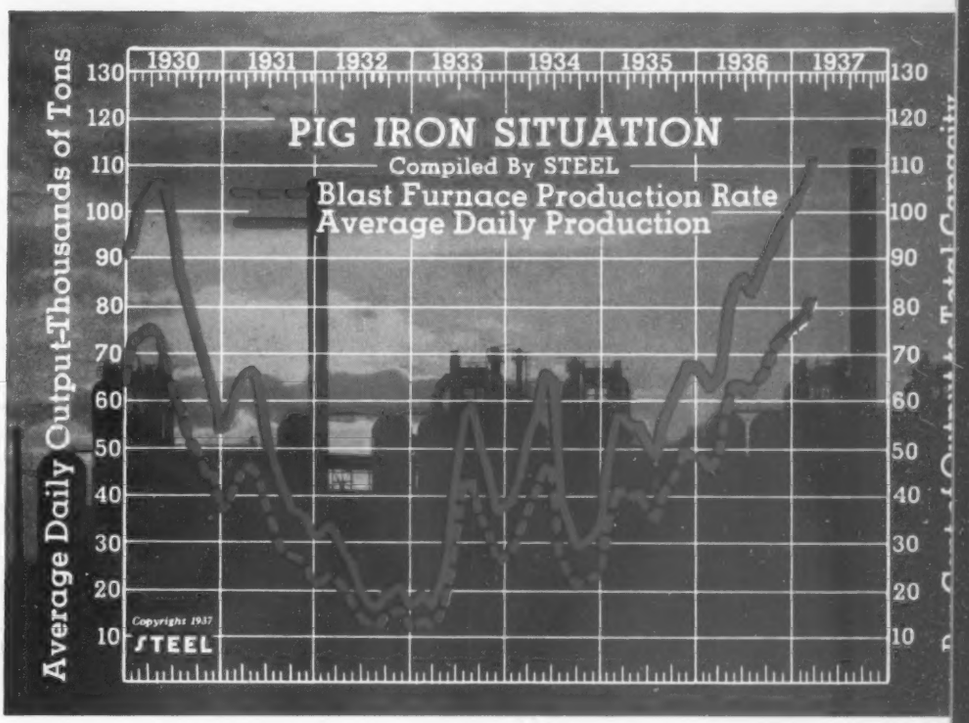
Index of Industrial Production Shows Slight Gain in February

	1937	1936	1935	1934
January	115	98	91	78
February	116	94	89	81
March	...	93	88	84
April	...	100	86	85
May	...	101	85	86
June	...	103	86	84
July	...	107	86	75
August	...	108	87	73
September	...	109	89	71
October	...	109	95	73
November	...	114	98	74
December	...	121	104	86


INDEX OF INDUSTRIAL PRODUCTION
Adjusted for Seasonal Variations
Daily Average 1923-25=100
Computed By Federal Reserve Board
Per Cent
1930 1931 1932 1933 1934 1935 1936 1937
Copyright 1937 STEEL

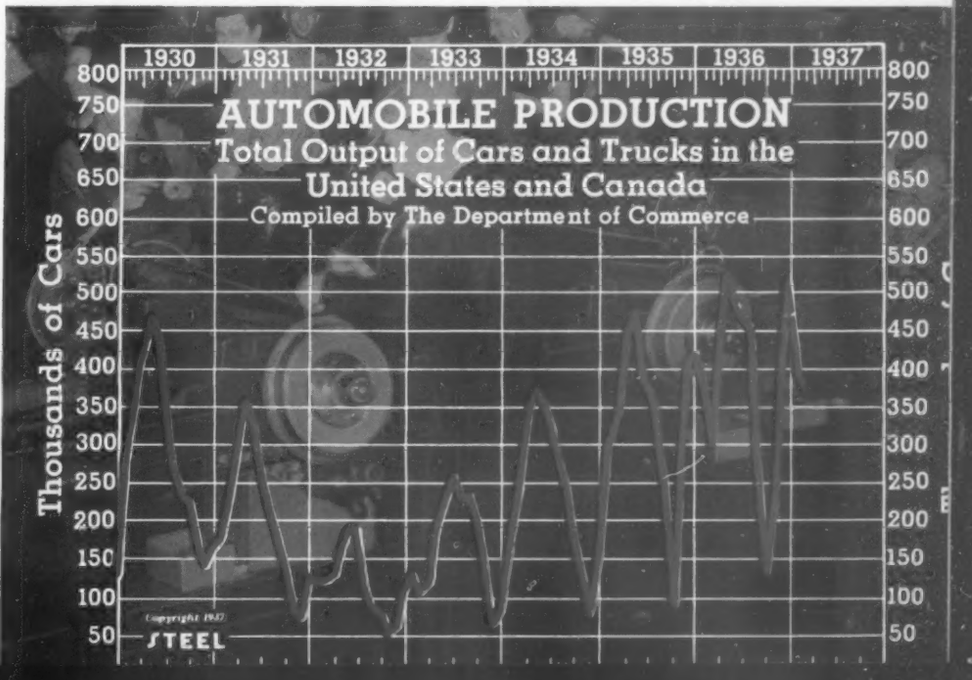
March Pig Iron Output Up 3.1 Per Cent

	Daily Average, Tons		Blast Furnace Rate, Per Cent	
	1937	1936	1937	1936
Jan.	103,863	65,461	76.6	48.2
Feb.	107,857	63,411	79.5	46.6
March	111,233	66,004	82.0	48.5
April	.....	80,316	....	59.1
May	.....	85,795	....	63.1
June	.....	86,551	....	63.6
July	.....	83,735	....	61.5
Aug.	.....	87,475	....	64.3
Sept.	.....	90,942	....	66.9
Oct.	.....	96,509	....	71.0
Nov.	.....	98,331	....	72.3
Dec.	.....	100,813	....	74.2


PIG IRON SITUATION
Compiled By STEEL
Blast Furnace Production Rate
Average Daily Production
Average Daily Output-Thousands of Tons
1930 1931 1932 1933 1934 1935 1936 1937
Copyright 1937 STEEL

February Automobile Output Continues Downward

	1937	1936
January	399,426	377,306
February	383,637	300,874
March	.....	438,945
April	.....	527,726
May	.....	480,571
June	.....	470,887
July	.....	451,474
August	.....	275,951
September	.....	159,785
October	.....	229,989
November	.....	405,702
December	.....	519,132


AUTOMOBILE PRODUCTION
Total Output of Cars and Trucks in the United States and Canada
Compiled by The Department of Commerce
Thousands of Cars
1930 1931 1932 1933 1934 1935 1936 1937
Copyright 1937 STEEL

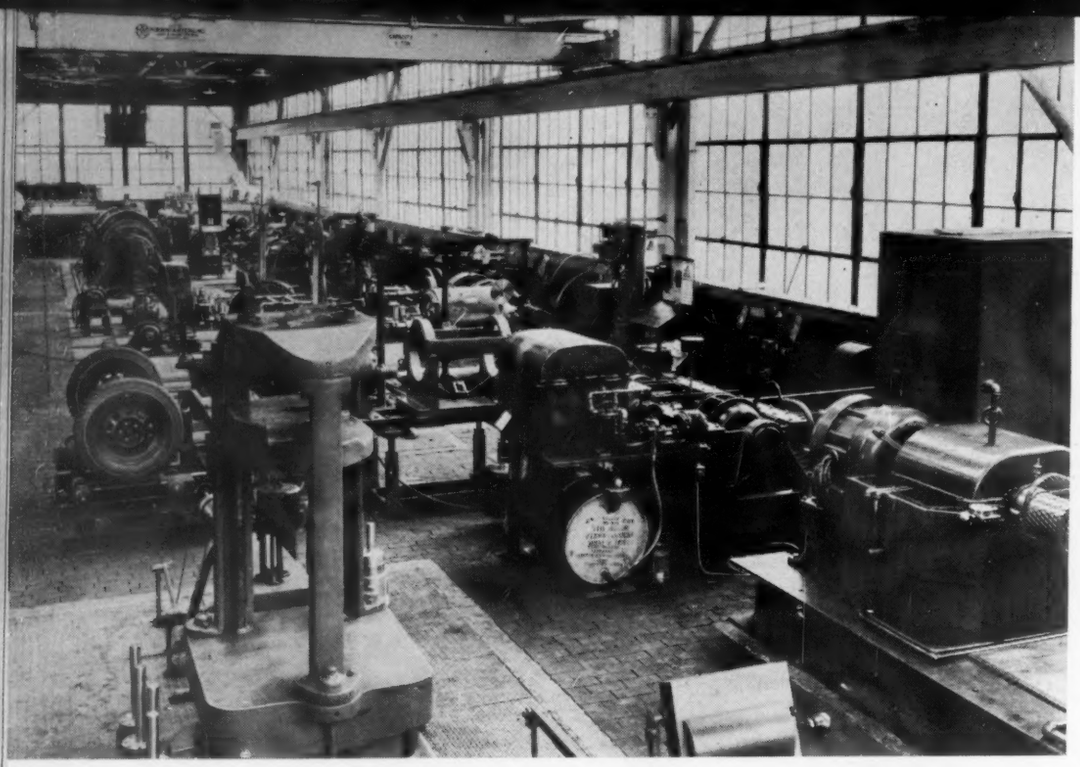


FIG. 1—This presents a general view of the main room of the new research and physical testing laboratory. Much of the equipment is of special design

Bearing Manufacturer Expands

MANUFACTURE of antifriction bearings requires the maintenance of complete research and physical testing facilities for studying bearing performance under the equivalent of service conditions. Among the problems concerning which the manufacturer must have accurate knowledge are behavior and life of bearings under all types of loading and many variations in lubrication, quietness of operation, fatigue resistance, stress concentration and surface finish of bearing parts. Furthermore, equipment must be available for obtaining this information for bearings ranging from the small, light-duty type to the large, heavy-duty mill and railroad axle types.

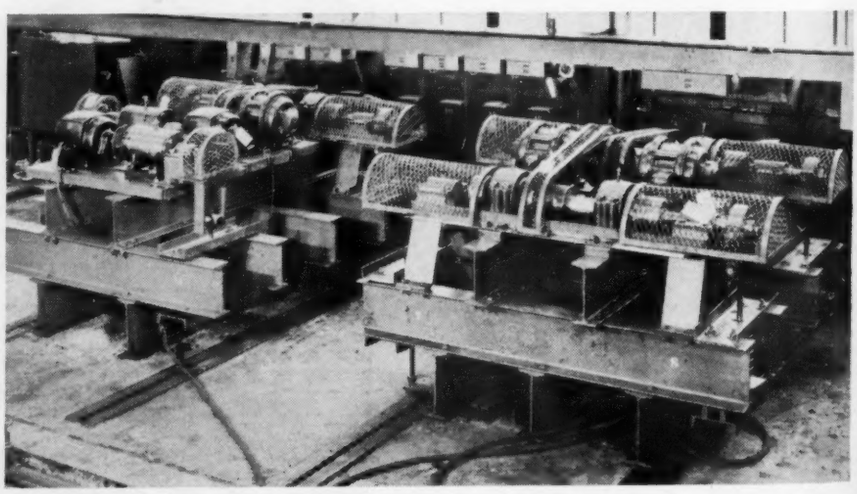
Laboratory Is Well Equipped

To keep pace with the increasing demand for bearings of the tapered roller type, the Timken Roller Bearing Co., Canton, O., recently has expanded its research and testing facilities to a point where it is believed to be the most completely equipped unit of its kind in the United States. New quarters have been provided for the laboratory and considerable new equipment has been installed, much of it specially designed and unique. Housed in a single-story, well-lighted brick building 150 x 80 feet, the laboratory stands across the street from the main office and factory, and is easily accessible and convenient for personnel.

A general view of the main room in the new unit is shown in Fig. 1. The far end of the room is occupied by a battery of eight machines designed to test bearings up to 8 inches outside diameter to destruction under radial and thrust load. These machines, shown in Figs. 11 and 12, consist of test spindles on which are mounted four bearings. Two spindles are connected by a coupling and driven through spiral gears from a motor shaft, each shaft driving up to four sets of spindles. By changing the spiral driving gears, a wide range of speeds can be obtained.

Bearings are loaded in these machines by hydraulic pressure system, oil being supplied at 1800 pounds per square inch to the control system and each spindle being equipped with an adjustable relief valve. Through these valves the oil is fed to cylinders, one being located below each spindle. The cylinders and the pistons float, trans-

FIG. 2—Automotive rear axles ranging up to 2 inches in diameter are subjected to fatigue tests in the battery of machines shown in this illustration



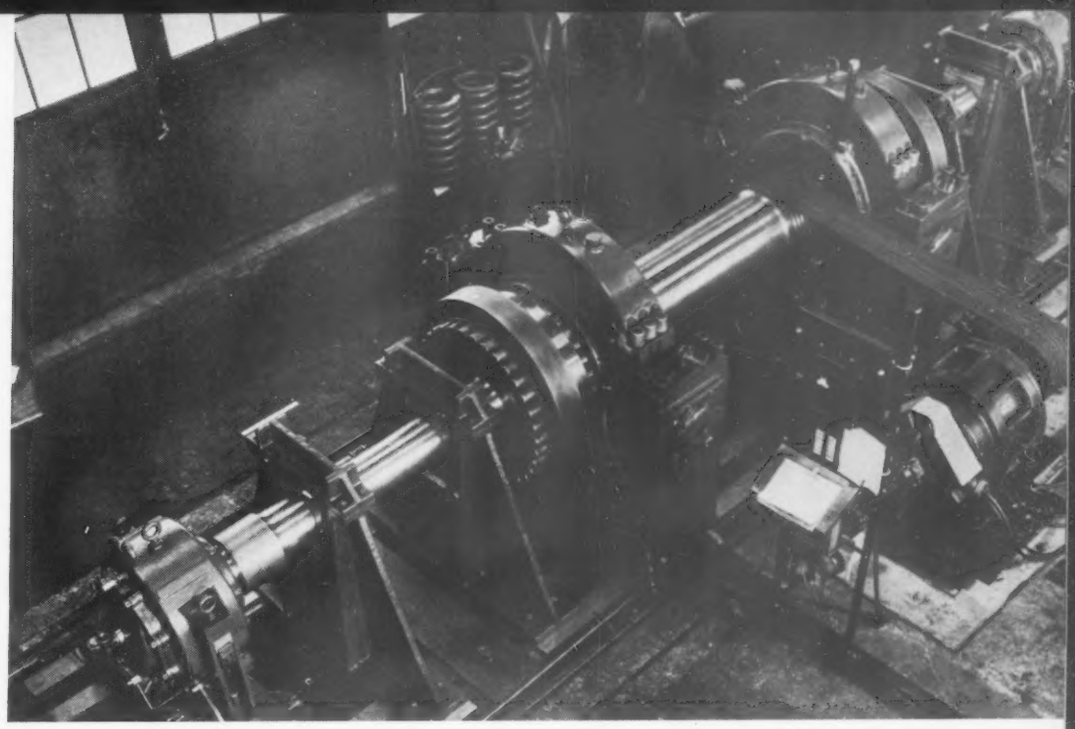
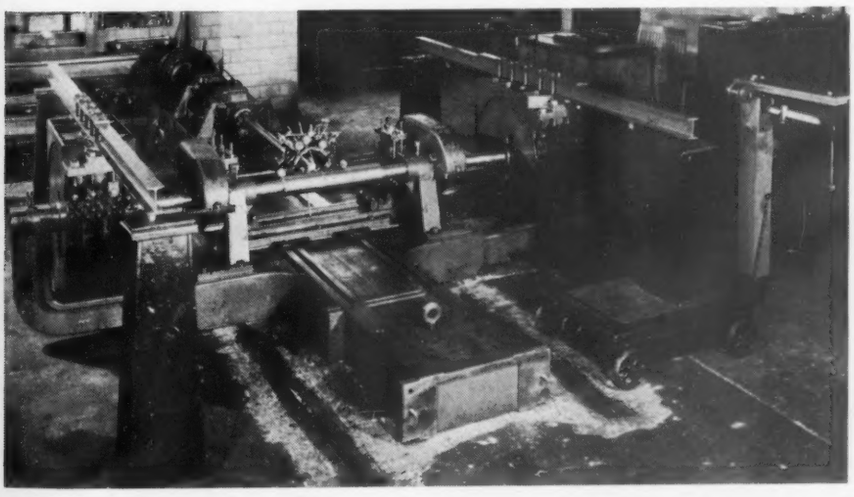


FIG. 4—Locomotive driving axles 8 feet long and up to 14 inches diameter are given fatigue tests in this machine, the only one of its kind in existence

Research and Testing Facilities

mitting the load through bellcranks on a fixed mounting to a yoke connected to the center bearings on the spindle. The load is then transmitted to the bearings at each end of the spindle. By this arrangement all bearings receive the same load. Thrust load is applied through a lever system compensated by knife edge levers to obtain concentric loads. In the case of small bearings, the thrust load is applied by dead weighted levers, while on the larger bearings it is applied by hydraulic pressure.

FIG. 3—This equipment is utilized for measuring the deflections in automotive rear axles. The axles can be broken down to find the weakest parts



Automobile rear axles and transmissions, also the bearings used in them, are tested in a 75-100-horsepower electric dynamometer and two hydraulic dynamometers, as shown in Fig. 6. This equipment was supplied by the General Electric Co., Schenectady, N. Y. As installed in the Timken laboratory, these units make available a speed range of 200-4000 revolutions per minute on the propeller shafts, which makes the equipment extremely useful for checking the oil flow characteristics of both truck and passenger car axles.

In this unit, the axles are loaded at the spring pads, which assures that the housing will deflect in the same way it deflects in the field under service conditions. In the case of semifloating axles, the load line is offset from the bearings as is the case in service, the load being applied through an antifriction bearing mounted directly on the axle shaft. For full floating axles, an adapter is placed over the wheel bearings to receive the load. This applies the load exactly as it would occur in service, directly over the bearings. Knife edges at the load center line of the mountings enable the axle housings to deflect normally under load. Efficiency tests can be made in this machine by taking the torque reaction of the housing on a platform scale as shown in the illustration, Fig. 6.

Machines Specially Designed

A bearing testing machine, thought to be the largest in the world, is illustrated in Fig. 10. This was designed by Timken engineers to meet their special needs and, in it, single or double-row bearings up to 24 inches outside diameter, can be tested to fatigue under both radial and thrust load. Radial loads up to 500,000 pounds and thrust loads up to 200,000 pounds may be applied to the bearings under test

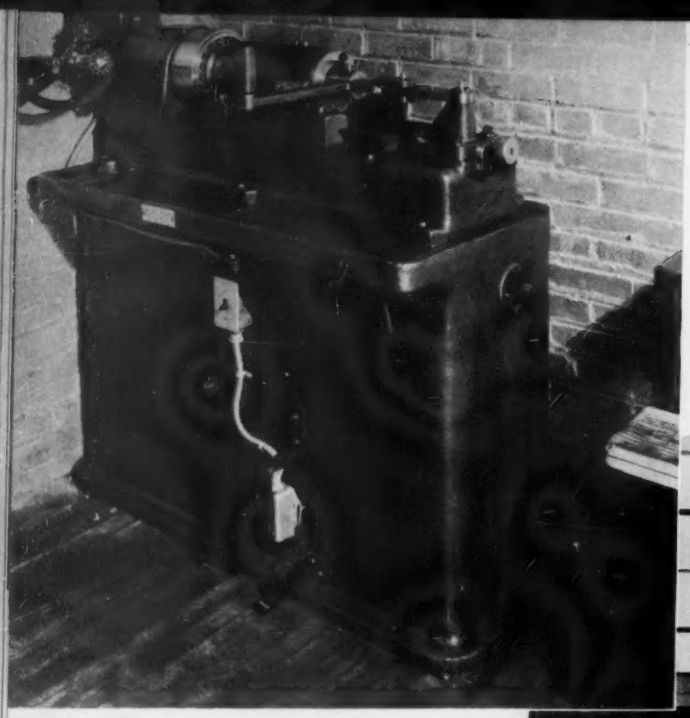


FIG. 5 (left)—Quietness of bearings is investigated on this machine, which permits a bearing to be loaded with any pressure up to 1000 pounds and run in a sound-proof room. The machine can be run at constant speeds or accelerated or decelerated as desired

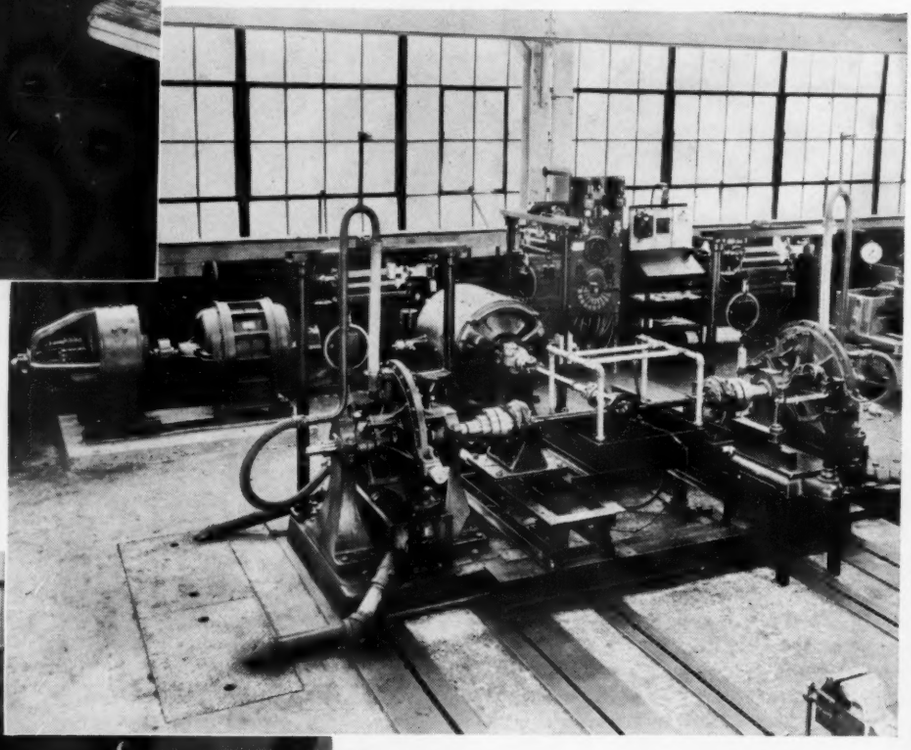


FIG. 6 (right)—Three dynamometers, one of electric type and two of hydraulic type, are provided for complete testing of automobile rear axles and transmissions

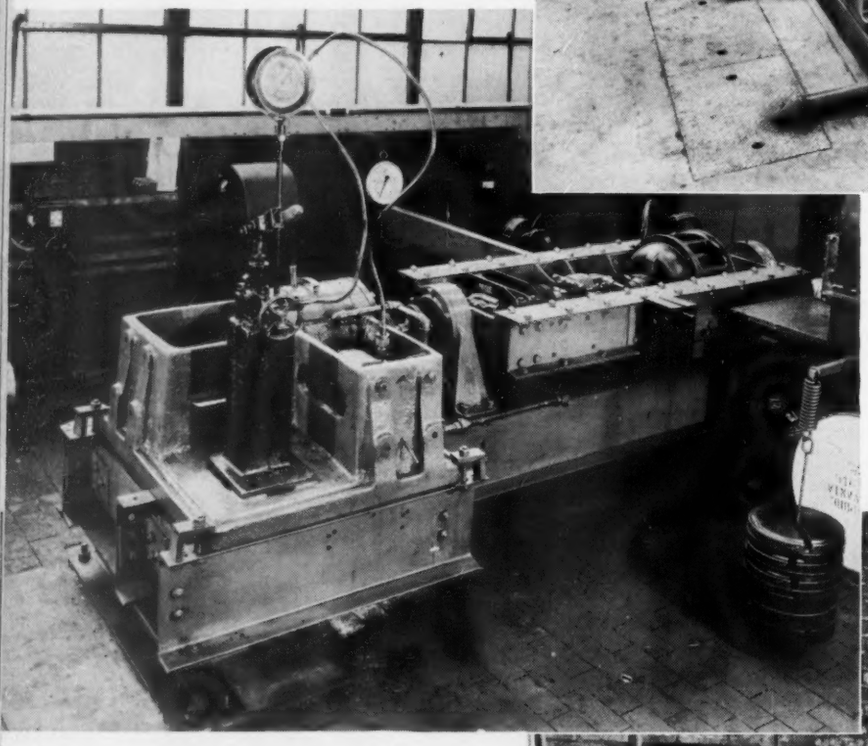


FIG. 7 (left)—This 12-inch machine supplements the 24-inch unit shown in Fig. 10 for testing the performance of roller bearings under both radial and thrust load

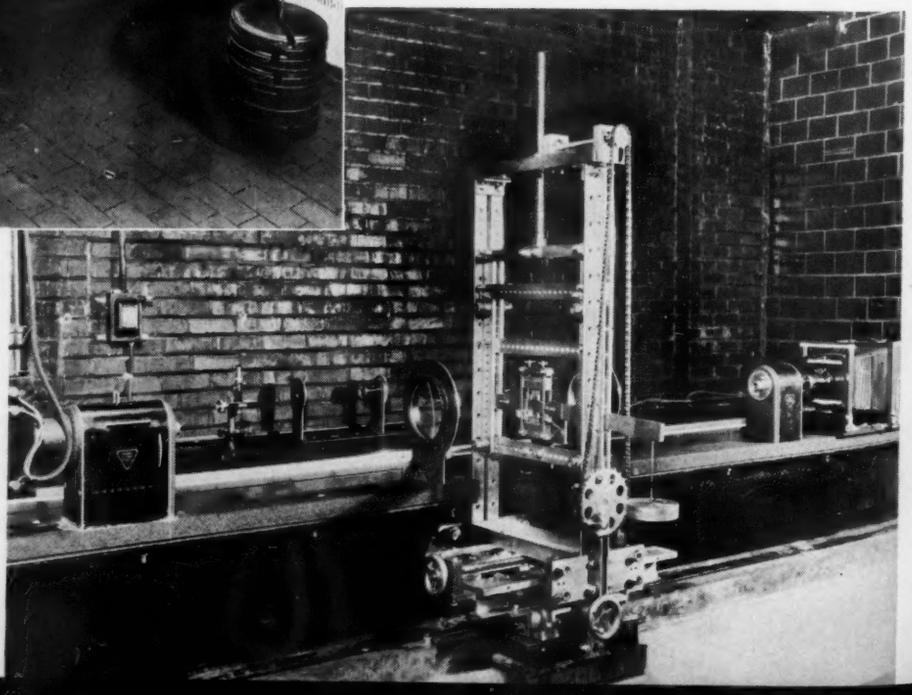


FIG. 8 (right)—The new laboratory possesses one of the country's largest and most complete set-ups for photoelastic investigation. With this equipment, much valuable information concerning stresses and their distribution already has been obtained

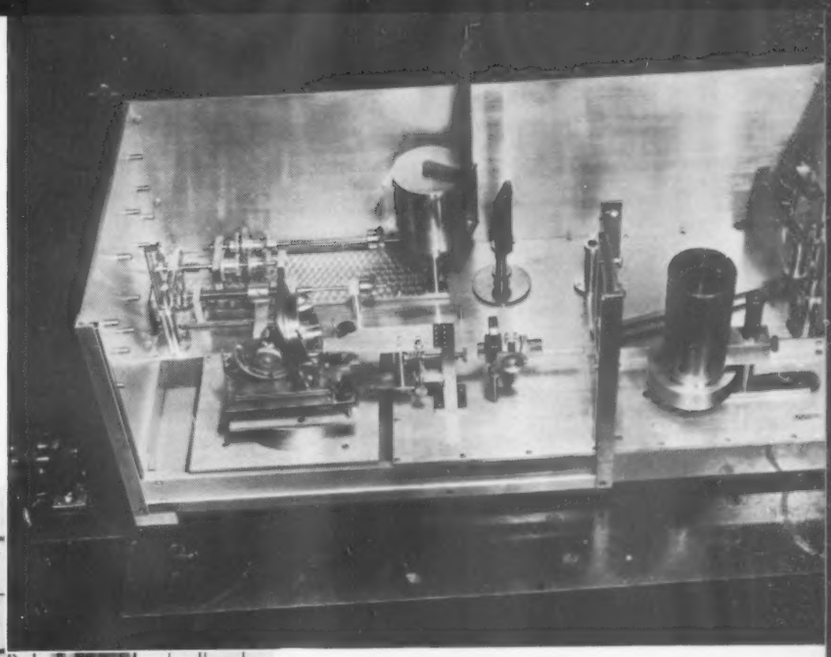


FIG. 9 (right)—Two profilographs of the type pictured here are installed in an air-conditioned room. They are used for examing surface finish of steel. One instrument has vertical magnification of 5000X, the other 2000X

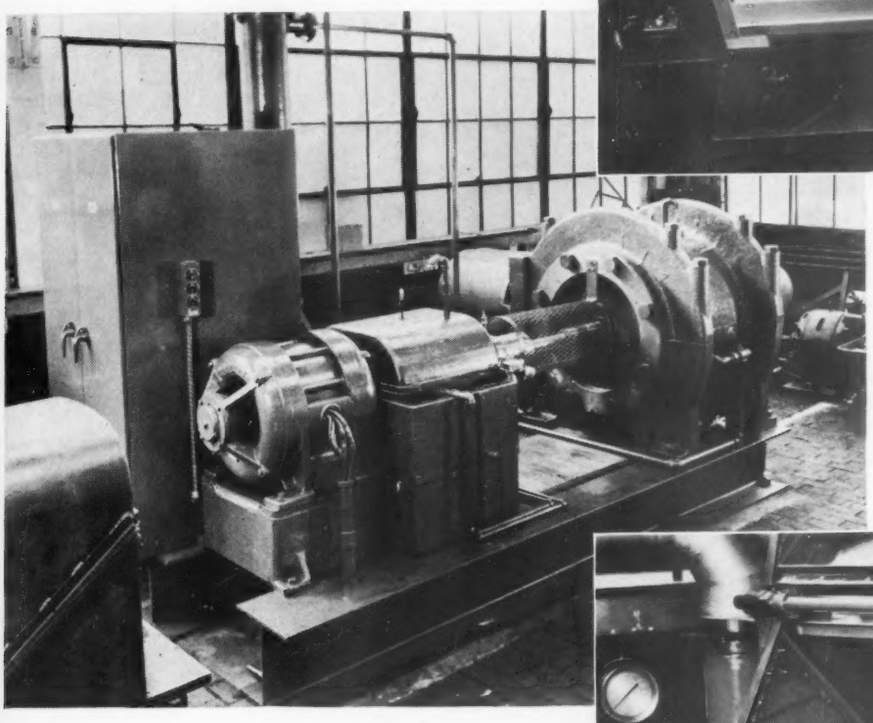


FIG. 10 (left)—Bearings up to 24 inches outside diameter are tested under both radial and thrust loads. This machine was specially designed and is said to be the largest in the world. Smaller bearings are tested in the machine shown in Fig. 7

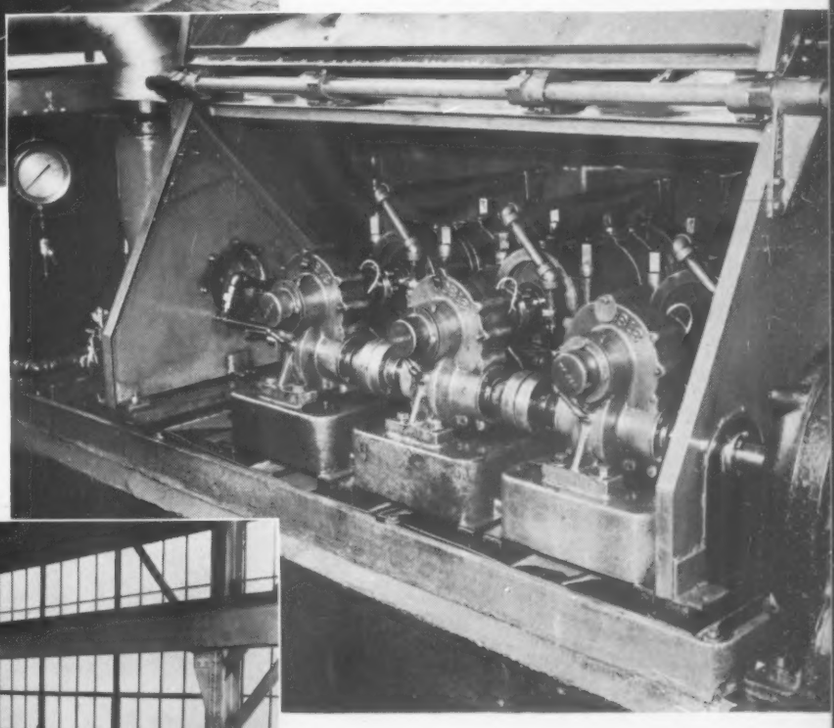


FIG. 11 (right)—A view inside one of the battery of eight machines shown in Fig. 12. Bearings are placed on spindles and up to four spindles are driven through gears by a single motor

FIG. 12 (left)—This battery of eight machines tests bearings up to 8 inches outside diameter to destruction under radial and thrust loading. Speed is adjustable through a wide range. Loading is accomplished by hydraulic pressure, except thrust loading of small bearings which is done with dead-weighted levers

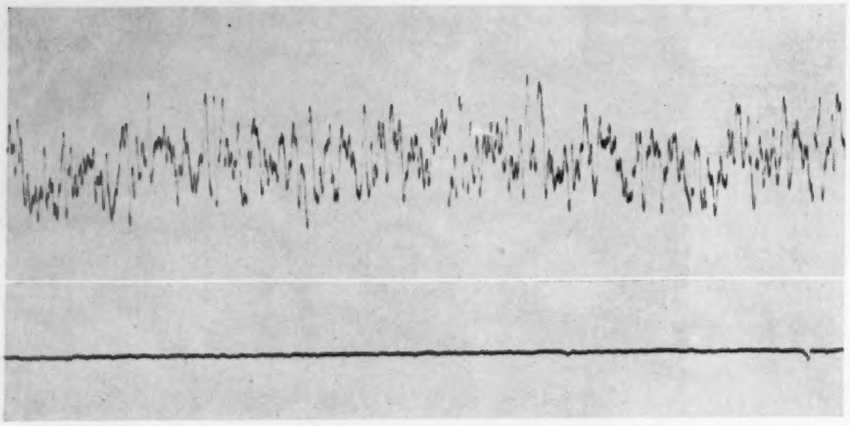


FIG. 13 — Profilograph prints showing the quality of surface finish of steel. The upper curve is for a good commercial ground finish and the lower curve for the mirror finish used on tapered roller bearings. Vertical magnification is 5000X; horizontal 30X

by means of hydraulic rams. Provision is made for filtering and cooling the lubricant. One pump circulates the oil through a cooler and delivers it to the housing, while a second pump draws the lubricant from the housing back to the oil tank beneath the machine. Provision is made for maintaining any desired oil level in the housing. A 75-horsepower, two-speed motor drives the bearings through a transmission capable of speed changes from 27 to 1000 revolutions per minute.

Power Loss Is Measured

A torque device, installed between the transmission and the test spindle, indicates the power loss in driving the bearings. This device consists of a square-section helical spring with sleeves attached to each end. A 45-degree slot is cut in one end of the spring, engaging with a pin in the sleeve, so that any circumferential movement between one end of the spring and the other will be transformed into axial movement of the sleeve. This movement is registered on the scale dial through a yoke and lever, the scale being calibrated in terms of inch-pounds of torque applied to the spring. As a constant temperature can be maintained by the circulating oil system in the bearings under test, any increase in torque indicates bearing failure.

Supplementing the 24-inch radial thrust machine is the 12-inch unit shown in Fig. 7. This machine, which has a capacity of 150,000 pounds radial and thrust load, measures torque through a cradle on which both the driving motor and transmission are mounted. The lubricant is circulated through a cooling system beneath the machine.

The equipment shown in Fig. 3 is used for testing the deflections of automotive rear axles. The axle under test is driven by a 20-horsepower motor through two automotive transmissions. A speed of 12 revolutions per minute is used for driving the pinion of the test axle. Torque is absorbed by two prony brakes which can absorb 20,000 foot-pounds, maximum input torque being 2500 foot-pounds. Loads are taken through 14-inch pitch diameter gears on the axle drive shafts, platform scales of 1-ton capacity being used to measure the load at the end of 5-foot beams.

Indicators are mounted from a ring bolted to the pinion barrel and all deflections are relative to this point, measurements being taken of the carrier, ring gear, pinion and bearing movements. Loads up to maximum low-gear torque are used for deflection checks and axles can be broken down to find the weakest part within the capacity of the machine.

Two profilographs of the type shown in Fig. 9 are installed in an air-conditioned room in the new laboratory. The unit shown is capable of 5000X vertical magnification, while the other is used for amplifications up to 2000X. This equipment was developed originally for the Timken company in the research laboratories of the University of Michigan, Ann Arbor, Mich., and is used for checking surface finish.

Variations Are Photographed

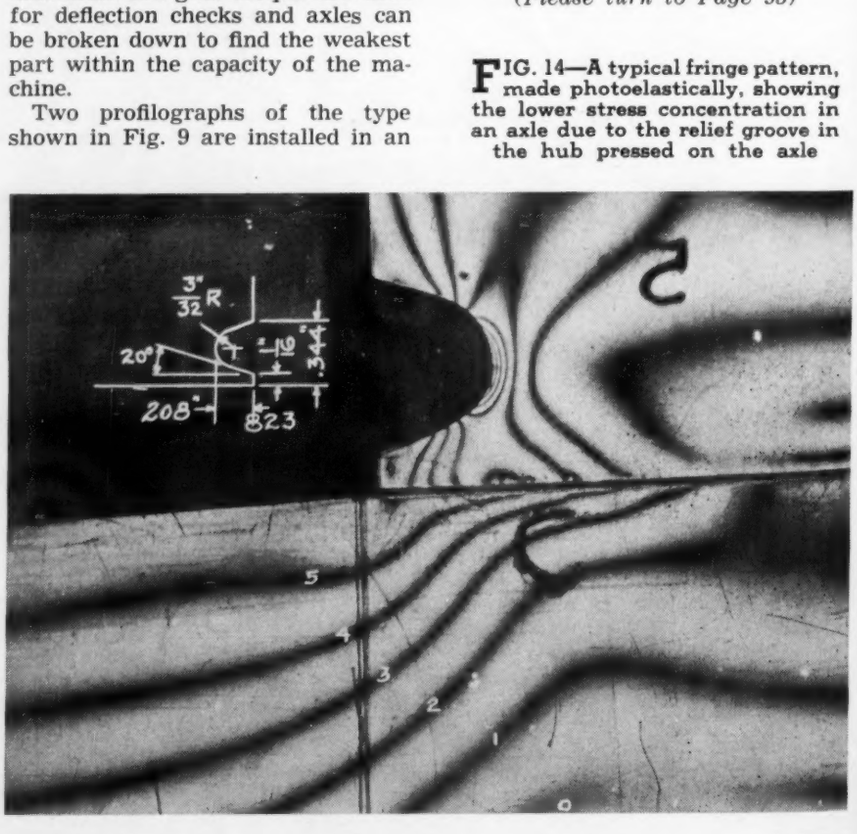
A beam of light from a 108-watt projection lamp passes through a slit and lens to a small mirror mounted at an angle on one end of a bell crank lever, the other end of the lever carrying a diamond point which rests on the specimen. The specimen is mounted on a platform having rectilinear motion, this platform being connected through gearing to the recording drum. From the small mirror the beam of light is reflected to a series of three other mirrors to increase the length of the light path, the beam being finally collected in a cylindrical lens and focused to a pin point on a sheet of sensitized paper mounted on the drum shown at the back of the panel.

Fig. 13 shows a profilograph print at 5000X of a good commercial ground finish (upper) as compared to the mirror finish (lower) used on Timken bearings. Horizontal magnification is 30X.

To check the quietness of bearings, the machine shown in Fig. 5 was developed. This machine allows a bearing to be loaded with any

(*Please turn to Page* 95)

FIG. 14—A typical fringe pattern, made photoelastically, showing the lower stress concentration in an axle due to the relief groove in the hub pressed on the axle



MATERIALS HANDLING

Roller Conveyor Is Shock Absorbing With Rollers Resiliently Mounted

FOR many years roller conveyor was used principally for conveying lumber, shingles, brick, packing, shipping, tote boxes, and similar materials and products in warehouses and factories. During the past decade, however, many new uses have been found for conveyors and today they are essential equipment in most large industrial plants, serving production and assembly operations in a wide variety of ways.

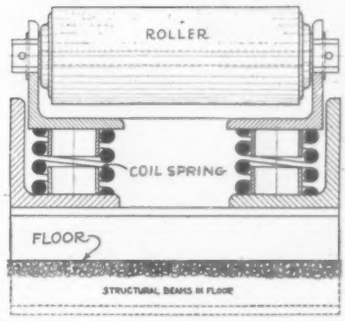
Examples of installations are found on every hand in the metalworking industry. In steel plants, for instance, roller conveyor is used widely for conveying heavy materials. Piles of sheet steel weighing up to 40,000 pounds are moved from one point of operation to another on conveyors. Strip steel of sufficient width to form the one-piece tops of automobiles is rolled into lengths hundreds of feet long, coiled into coils weighing up to 25,000 pounds and transferred on roller conveyors.

Foundries utilize this type of conveyor for handling molds and castings. Frequently the castings are placed on racks which in turn are carried on roller conveyors. In one foundry, as shown in an accompanying illustration, cast steel side frames for railroad car trucks are placed closely together on a rack 20 feet long and the rack moved on a roller conveyor. Combined weight of the rack and side frames sometimes is as high as 12,000 pounds.

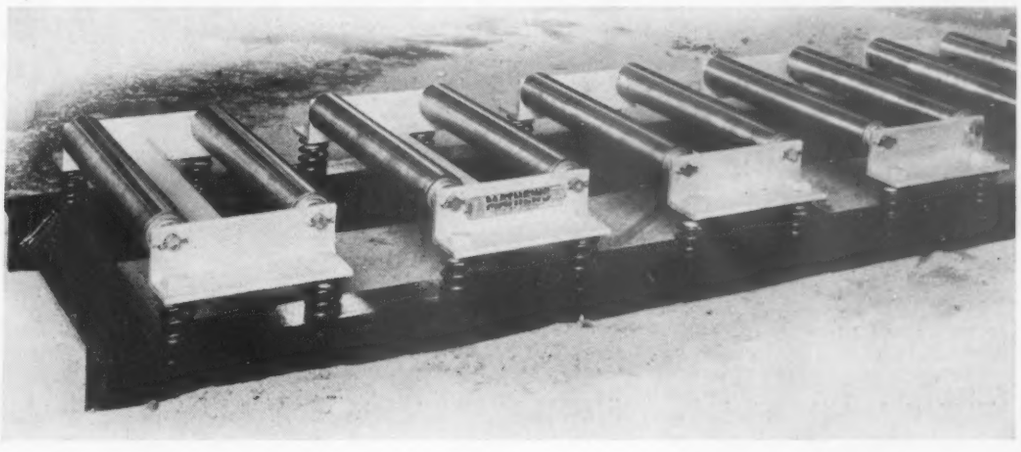
Equipment Subject to Abuse

Roller conveyors handling heavy loads often are subjected to abuses resulting from the loading and unloading of heavy material, consequently, it has been necessary to improve the design of bearings and rollers constantly as the severity of service increased. The first step, of course, was to build the conveyors heavier consistent with the loads to be carried, but added strength did not always overcome some of the more serious difficulties.

A case of this kind was found in a steel foundry in which the Mathews Conveyer Co., Ellwood City, Pa., had installed a roller conveyor for handling molds weighing 8220 pounds. The molds were 40 inches long and were carried on steel skids, consequently the conveyor rollers with solid mountings were spaced on 4-inch centers so that theoretically the load would be supported at all times by ten rollers. With each roller carrying its proportionate share of the weight, the burden would be 822 pounds per roller. By actual test, however, it was found that because the molds had uneven bottoms the skids were distorted, therefore, the load was carried by only two rollers. As a result, each of these two rollers supported loads of 4110

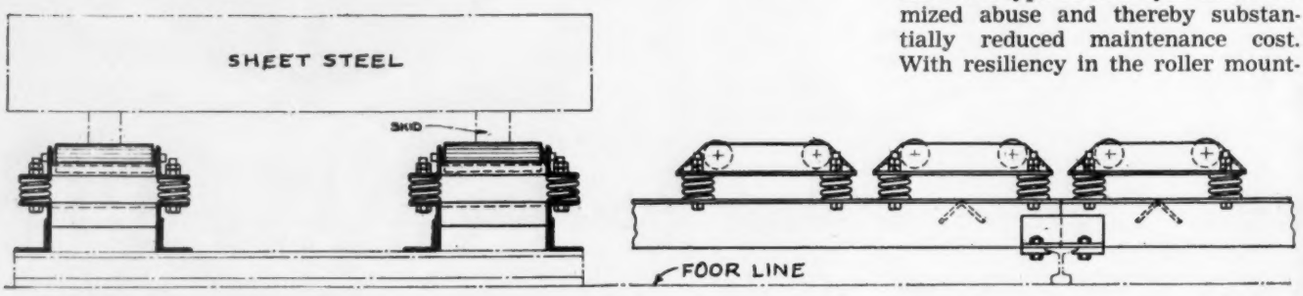


Cross section of a roller conveyor provided with shock-absorbing, resilient mounting



EACH pair of rollers in this section of conveyor are mounted in a cradle which rests on four coil springs. Shocks are absorbed by the springs

MATERIALS HANDLING



CROSS SECTION and side elevation of a double-row, resiliently-mounted conveyor for handling sheet steel on skids

pounds instead of the 822 pounds as calculated.

Assuming that the rollers had a rated load carrying capacity of 1000 pounds each, it was to be expected that failure would occur when a load of four times rated capacity was imposed. Actually, this was what happened. Engineers of the Mathews company made a number of tests and in every case it was found that the load was not evenly distributed on the rollers.

In this particular plant, the maintenance cost of conveyors had reached the point where it was prohibitive. This necessitated definite action to find some means of preventing the abuse to the bearings on the rollers and thereby to lower the cost of upkeep. After extensive tests had been made to determine the cause of bearing failures, the problem resolved itself into that of devising some means for making each roller carry its proportionate share of the load.

Solution ultimately was found in the development of a shock-absorbing, resiliently-mounted type of roller conveyor shown in the accompanying illustrations. In this new type, each pair of rollers is mounted in a cradle which rests on four coil springs to permit motion of the rollers vertically. The cradle being of rigid construction, the two rollers rotate freely on their bearings under all conditions of loading. This principle of shock-absorbing, resilient mounting is applicable to all sizes of roller conveyors.

From tests made by the Mathews company and six months' use of the equipment in service in one of the country's steel foundries, it has been found that the resiliently-mounted type of conveyor has minimized abuse and thereby substantially reduced maintenance cost. With resiliency in the roller mountings, each roller is forced to carry its proportionate share of the load, thus bearing friction is reduced to normal. Because of this, it is now possible to reduce considerably the coefficient of friction used to calculate the effort required to move loads over roller conveyor.

In handling large coils of steel in strip mills, the coils generally are loaded upon the conveyor with a crane equipped with an electromagnet. These magnets weigh about 10,000 pounds. Crane operators frequently are careless in loading the coils upon the conveyor and drop the coil and magnet on the conveyor with considerable impact. The shock which the rollers must withstand when a 35,000-pound weight is dropped upon the conveyor is tremendous.

Substantially the same condition is found at the points where the

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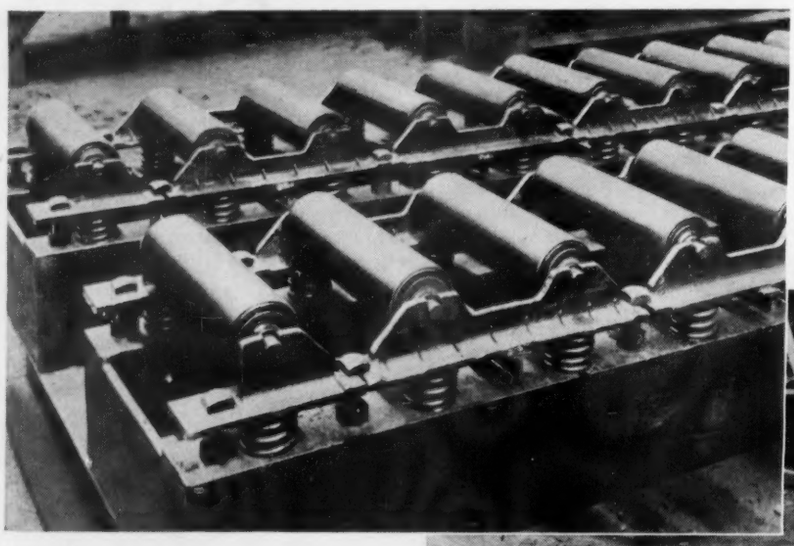

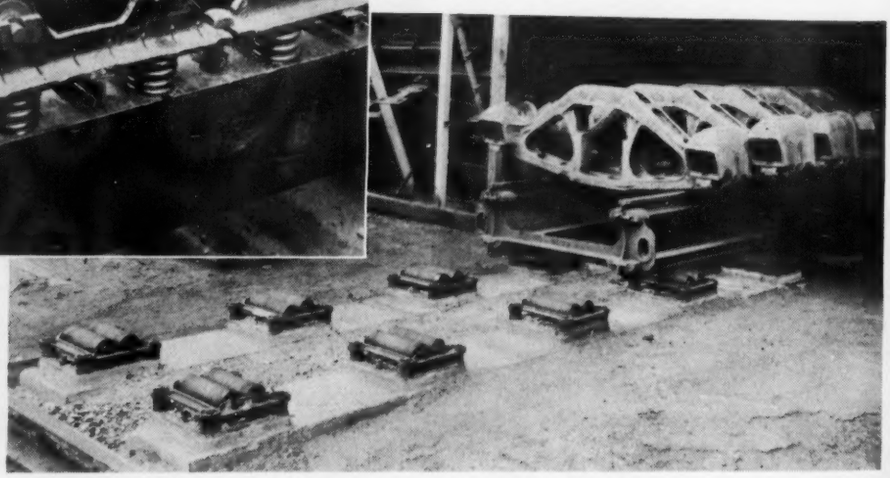

SPRING-MOUNTED rollers installed as shown at the right carry their proportionate loads when a rack of heavy steel castings pass over them. Another type of shock-absorbing conveyor is shown above

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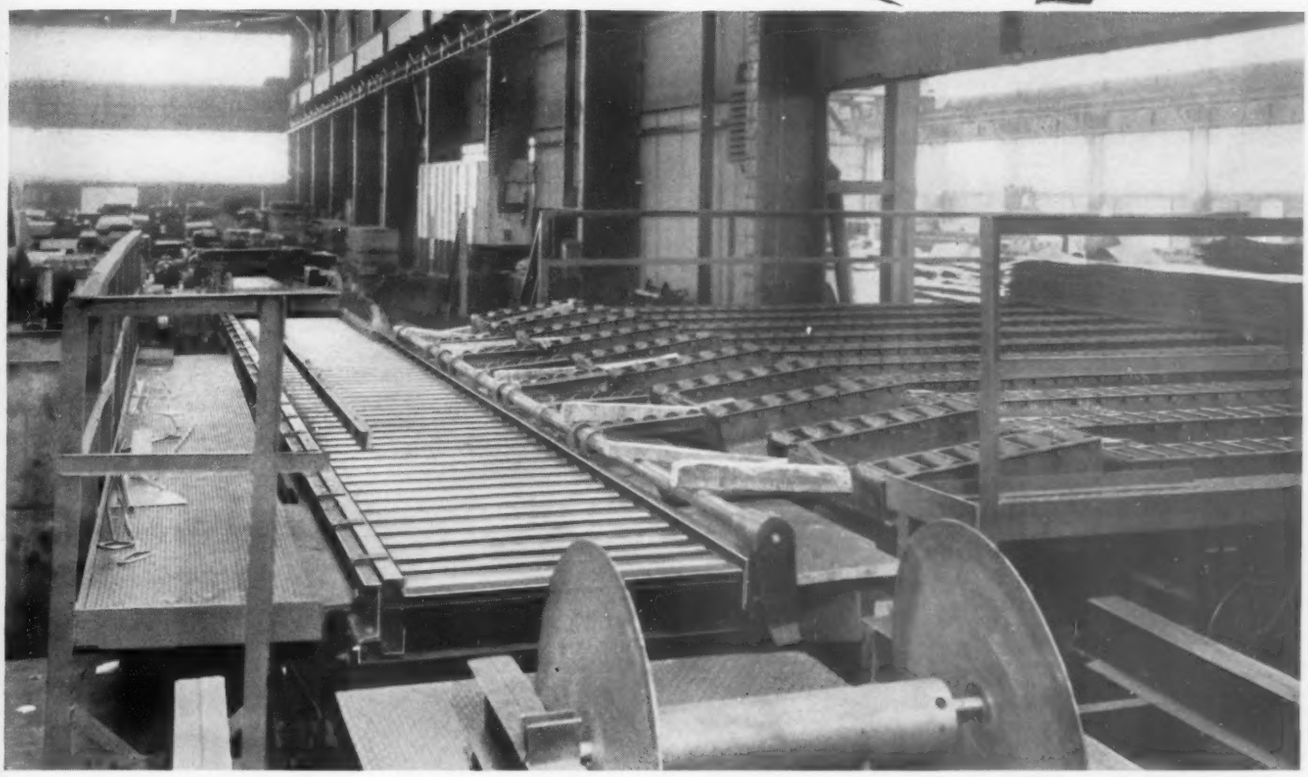

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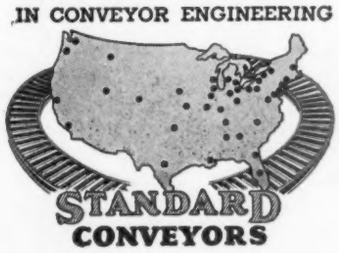

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WELDING, ETC.

BY ROBERT E. KINKEAD

Not Going to the Dogs

AMONG the writer's clients apprehension is growing over the ascending spiral of wages and prices. Prices can become so high buyers cannot buy, in which case recovery will stop and depression start. But in spite of this fear, wage earners ask for more wages and managements ask for higher prices. It seems likely to us presently both wage earners and capitalists will go to the President and ask him to save them because they cannot save themselves. The President forecast just such a situation when he demanded changes in the supreme court so that the government would have unquestioned power to act under such circumstances.

The theory that rights guaranteed by the constitution are real is contradicted every day in the police courts and in the fact of successful sitdown strikes in which property is seized and held until its owners capitulate.

The common laws of equity as conceived by the majority of voters are fundamental laws of the land. Whether the chief justice of the supreme court parts his whiskers in the middle or is 90 years old is of no consequence; economic life continues as a struggle between human beings for the fruits of toil. If no other way can be found, and none has, then the government must referee the struggle to the end that the "haves" and the "have nots" shall not destroy each other.

The country is not going to the dogs, nor is another terrible depression about to begin. When it is necessary and expedient for the President to intervene, he will do so—at the invitation of the parties concerned. When both parties to the struggle ask for such intervention, neither will be greatly concerned about what the supreme court thinks about it.

Great Man Has Passed On

DR. ELIHU THOMSON, inventor of resistance welding, died March 13 at the age of 84. Rich in honors, happy in the love and respect of his friends, his was a successful life. To have and hold the love and respect of friends is to live a successful life; to have made more than 200 inventions which were patentable and that many more which were not patentable is to acquire rank with the greatest souls in history. Elihu Thomson did all this and remained a simple hearted man of science who wore old clothes and carpet slippers around his laboratory.

IN this column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL

Development Worries

DEVELOPMENT work in welding is a common activity among companies which maintain large welding departments. It is necessary if costs are to be continually reduced. Cost of steel, welding rod, power, accessories are costs which the user of welding cannot control. The one thing he has some measure of control over is the productivity of labor. The rate of pay of labor is set by local or national conditions. Development work arises from the necessity for keeping costs down. Companies which are not anticipating further rise in cost of their uncontrollable items are asking for punishment which will most certainly come.

Development personnel which really produces results is hard to find. It takes a strong constitution to travel the unbeaten paths and blunder six times in a row in the hope that the seventh time will get the right answer. Unless a man can meet with failure and keep his moral courage, he has no place in development work. Development work under pressure is mentally dangerous. Men who have done plow horse work for considerable time should not be put on development work with responsibility for getting results. They are mentally incapable of taking a chance. Ninety per cent of all development work never amounts to anything. The casual order to "put a man on it and develop it" is responsible for a great deal of financial waste and human agony because no effort is put on the task of putting the right man on the job.

Successful development men are frequently mean, ornery, and hard to deal with and almost always give the impression that they think they know it all. This is the normal behavior when he is holding himself responsible for the achievement of brilliant results. When he has licked a tough problem, the development man is often the most charming person in the world. But the mood seldom lasts more than three days;—by that time he is locked up in some other effort and has his quills all standing up.

Getting results in development involves some knowledge of how successful development men work.

Public Safety in Welding

THE devastating accident in the consolidated rural school at New London, Texas, was apparently the result of causes other than welded pipe connections. But the fact a similar accident in Ohio a few years back was due to improperly welded pipe focuses attention of responsible engineers on the subject of public safety. In the Texas accident it appears responsible professional engineers specified a heating system which was safe. A salesman talked the board of education into installing a system much less expensive but now proved to have been pitifully unsafe.

In the Ohio accident, salesmen instructed the men who did the welding upon which the lives of many people depended. Prior to the accident, the company involved had never had a professional review of the safety of their welding practices. The cost would have been so small as to have been negligible. It cost one million dollars to settle the damage claims arising from the accident.

States which have laws requiring registration of professional engineers are making a serious effort to protect the public from unprofessional engineering which can be dangerous in the extreme. There is a difference between the engineering of a professional who gets paid exactly the same for saying "no" as he gets for saying "yes" and the engineering of a man who is confronted with the necessity of selling a bill of goods.

Granting the salesman is just as important and useful a citizen as the engineer, in the interests of public safety, it is better to let the salesman do the selling and the professional engineer do the engineering.

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UNITED STATES STEEL

The Basic Open Hearth Process-III

Origin, Early History and Present Day Practice and Equipment Are Discussed

BY H. L. GEIGER

PROBABLY one of the best ways of conveying a description of the basic process is to present a log of a heat together with comments on the steps from the charging of the scrap to the tapping of the refined steel. Each basic shop has its own little variation in practice but fundamentally the operations are the same. Alloy steel melting practice is quite similar to high quality plain carbon forging steel practice in the open hearth department with the exception that the alloying additions are made to the steel. Slight differences in working slags may be involved for such reasons as prevention of excessive thickening from oxidized chromium, or one shop may recarb with hot metal where another may catch the carbon on the way down, but the chemistry of the process is fundamentally the same.

Starting the Process

Assume that a steel plant receives an order for 95 tons of SAE X-3140 specification steel to be rolled into 3¼-inch round cornered squares. The open hearth receives a tapping schedule from the schedule clerk in which is included this heat listing, the chemical range at which the heat is to be tapped and also including other metallurgical requirements listed by the customer, such as "hold to 5-7 McQuaid-Ehn grain size," "Must be normal to Ehn Test," "must be metallurgically sound with an inclusion rating of not more than 3.5 inches." "Must be metallurgically sound" usually implies that the heat should be quite thoroughly deoxidized so that there will be a minimum of surface and internal seams. This requirement is quite consistently met by most steel makers today.

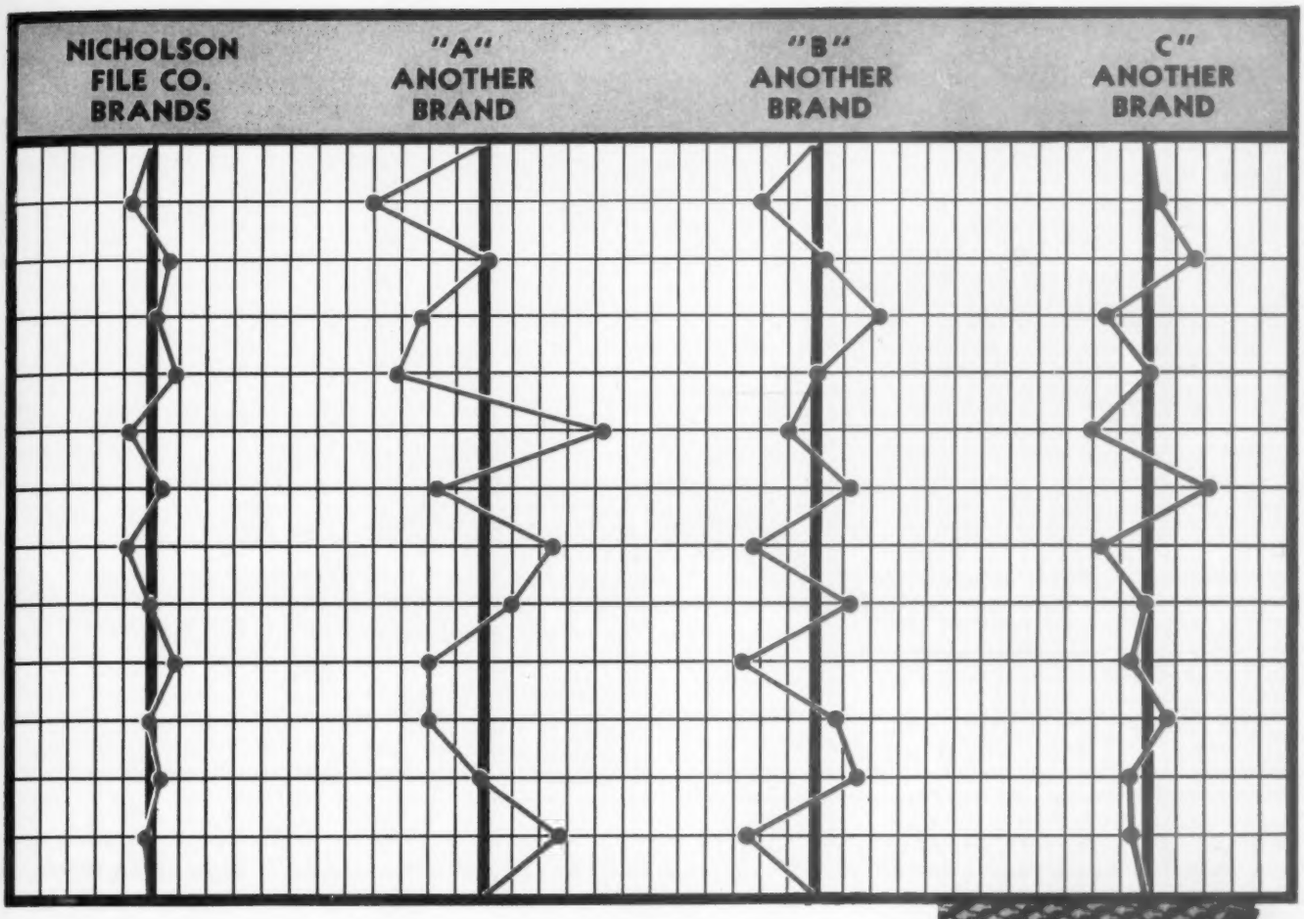
Once having been fully informed of the requirements of the heat, the melter figures out the charge necessary for this type of heat from the materials available in the stock yard.

When the charge is determined, order slips are sent to the scrap yard, the limestone storage and the pig iron storage yard where various grades of basic pig iron are usually kept on hand. For purpose of illustration a cold pig charge will be used in this heat. The charging pans are loaded with steel scrap and pig iron by means of electromagnets operated by both yard and overhead cranes. Limestone, in lumps from 4 to 8 inches in diameter, is loaded in the charging pans by means of a grab bucket type crane from piles or by gravity feed when the stone is stored in bins. The loaded charging cars are moved by a small switch engine to the scale house where the contents of each car are weighed on large scales designed for this purpose. The string of cars after being carefully weighed then is switched to the open hearth floor to await charging to one of the furnaces. Charging weight sheets from the scaleman are sent to the melter as soon as the string of cars arrives on the floor. The charge for this heat is as follows: Limestone, 10 pans or 22,750 pounds; steel scrap 168,310 pounds; pig iron 112,000 pounds; nickel 2002 pounds. The scrap charge is made up of 7300 pounds of 3100 specification forge shop flashings, 96,210 pounds of 3100 specification alloy billet butts and 64,800 pounds of miscellaneous heavy melting steel scrap. Pig iron charged contains 0.93 silicon, 0.028 sulphur, 1.63 manganese and 0.208 phosphorus.

The melter has scheduled this heat for furnace No. 8. As soon as the previous heat has been tapped out of this furnace the second helper and floor gang prepare the furnace to receive the above charge. The second helper plugs up the tap-hole with dolomite and loam while the floor gang makes bottom and fills in the slag line with dolomite, using a shovel or dolomite gun. This is done while the furnace is still white hot from the residual heat left in the furnace by the previous heat of steel. The furnace is ready to receive the charge as soon as the above tasks are completed and the first helper has satisfied himself that the bottom of the hearth does not need extra patching. The heat of X-3140 will have the number 81397, the first number indicating the furnace and the last four numbers the series.

In a large steel plant all records and heat numbers must be very

Part 3 of Mr. Geiger's article, presented herewith, describes, in the form of a log, the making of a heat of basic open hearth steel. Previous installments appeared in STEEL of March 29 and April 5. The fourth and last installment will appear in an early issue



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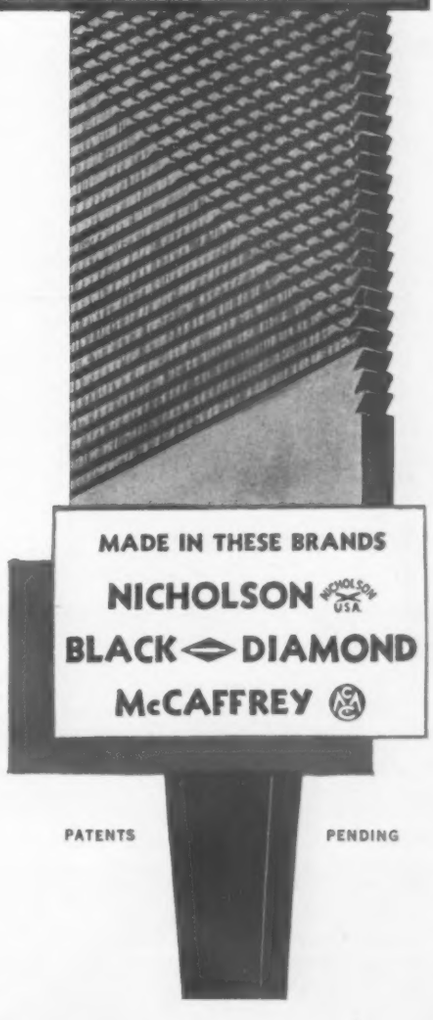


A FILE FOR EVERY PURPOSE

carefully recorded and carried through the mills with greatest of care to avoid any mix-up of the ingots and billets. For example, a steel plant with 12 to 15 open-hearth furnaces tapping 2500 to 3000 tons of steel in 24 hours to be rolled and sheared into possibly 4000 or more billets has a very intricate problem of classifying each billet or group of billets. Mis-scheduling of one billet into the wrong bar order may prove disastrous in a fabricating plant. Most steel mills are doing a very satisfactory job in this respect.

The following is a log of heat No. 81397, specification X-3140:

7:20 p.m.—Finished making bottom and slag line; 6000 pounds hard burnt dolomite used. Patched up small hole in front wall lining between No. 2 and 3 door; 400 pounds magnesite, 200 pounds chrome ore used;

7:26 p.m.—Flame turned on and reversals continued. (Flame usually is shut off during period when the floor gang makes bottom);

7:28 p.m.—Start to charge heat. Ten pans of limestone are spread over entire bottom of hearth, followed by 7300 pounds of alloy flashings. Next 96,210 pounds of alloy billet butts followed by 2002 pounds of electrolytic nickel and, lastly, by 64,800 pounds miscellaneous heavy melting scrap.

9:50 p.m. — Finished charging scrap;

10:30 p.m.—Scrap rapidly melting, molten metal trickling down over scrap charge;

11:10 p.m.—Pools of metal are forming around edge of scrap pile. No signs of any action in molten metal;

11:35 p.m. — Start charging cold pig iron over partly melted steel scrap;

11:58 p.m.—Finish charging cold pig iron;

12:20 a.m. — Pig iron starts to melt, vigorous boiling action being noted in pool of metal rapidly forming around scrap pile. This action continues for about 1½ hours;

2:35 a.m. — Scrap is completely covered by molten metal;

2:45 a.m.—Light even carbon boil begins over entire surface of the molten metal. (This action is caused by liberation of carbon monoxide and carbon dioxide gas from the combination of carbon and ferrous oxide in the molten metal);

3:20 a.m.—Most of scrap has been dissolved, as evidenced by vigorous boiling action in several places over the surface of the bath. (The vigorous local boiling action is due to liberation of carbon dioxide gas in calcining of limestone which still is held on the bottom by the remaining unmelted scrap);

3:28 a.m.—Slag starts foaming action over the entire surface of bath;

3:35 a.m.—Lime boil commences in full vigor. Large volumes of gas are liberated all over surface of bath, throwing slag and metal 6 to 12 inches high locally;

3:45 a.m.—Limestone commences to rise. Floaters noted at Nos. 1 and 4 doors;

3:47 a.m. — First helper adjusts valves, stack damper and flame to take care of increased evolution of gas from the lime boil;

4:10 a.m. — Violence of lime boil subsides. Bath is observed to be covered with partly dissolved pieces of limestone which have risen from the furnace bottom. Considerable action still is noted at Nos. 3 and 4 doors;

4:20 a.m.—First helper shovels in

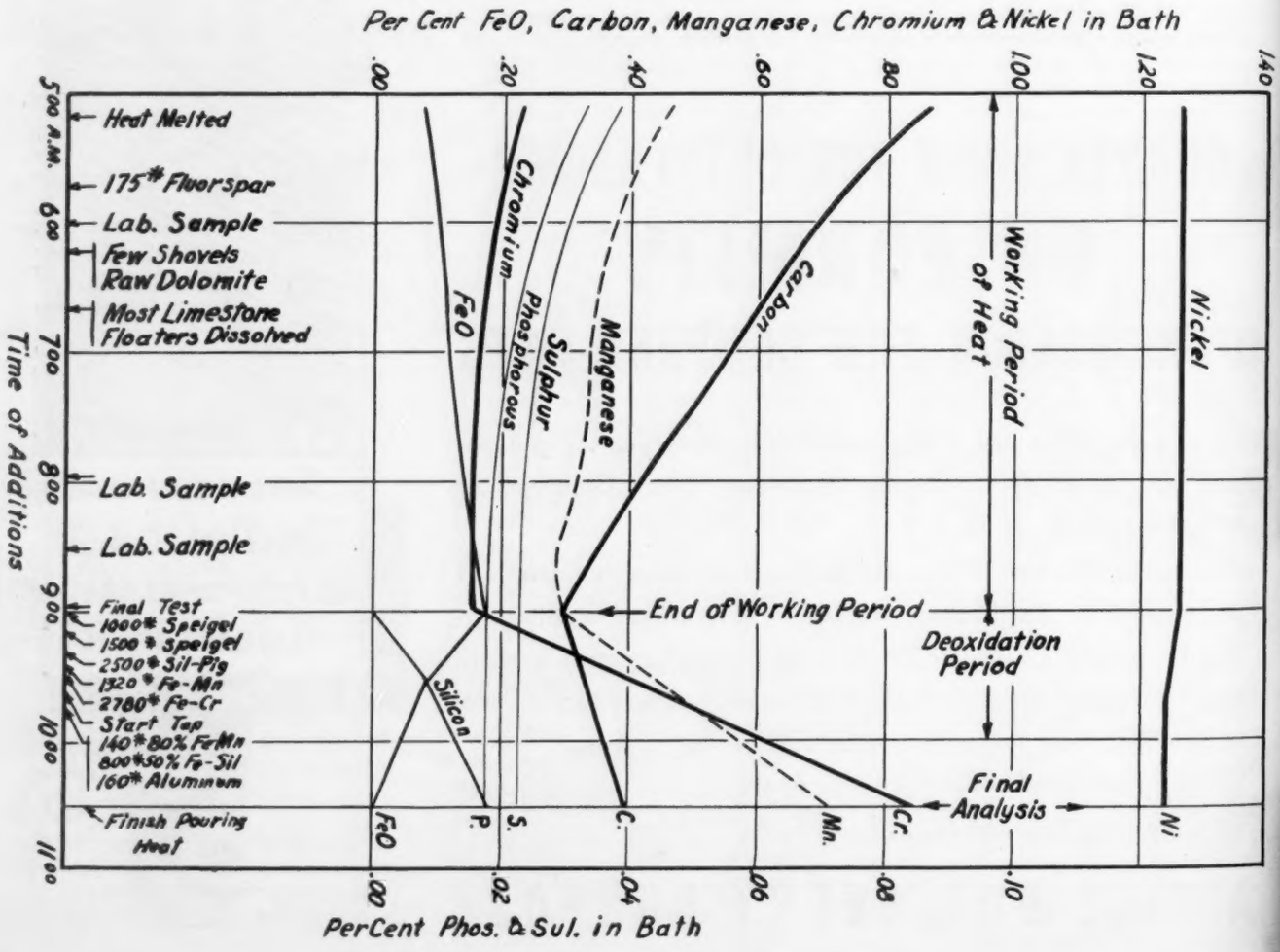
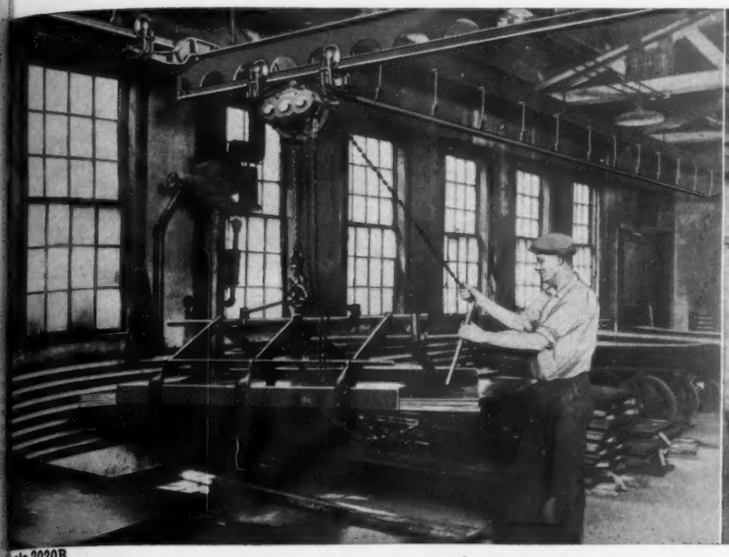


Fig. 10—This chart represents a log graph of a heat of basic open hearth steel

CLEVELAND TRAMRAIL MATERIALS HANDLING EQUIPMENT



oto 2020B

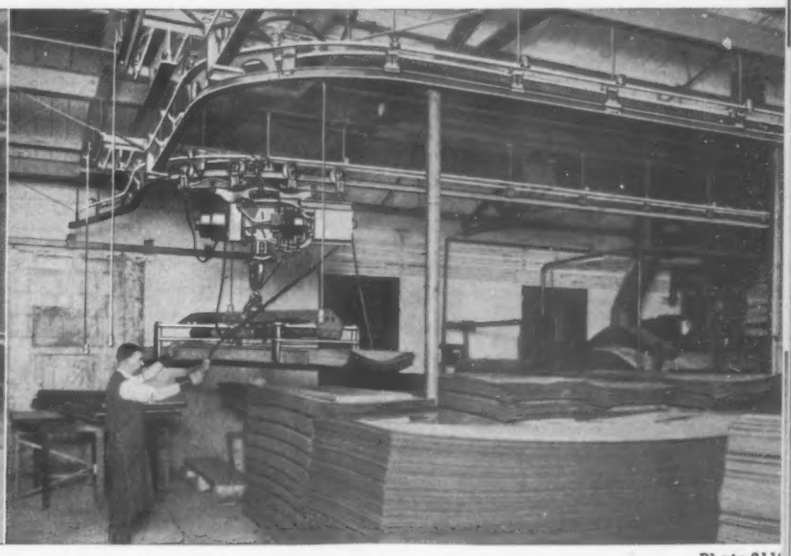


Photo 211

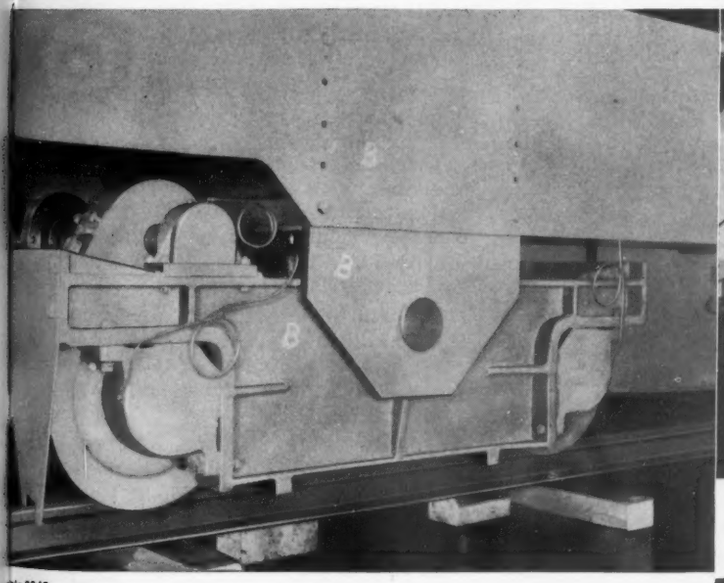
Photo 2020B Hand Propelled carrier chain hoist and hand operated grab.
Photo 2110 Hand Propelled carrier with motor operated hoist and grab, both push button controlled.

CLEVELAND TRAMRAIL

Consult your 'phone directory under Cleveland Tramrail

- Costs of handling Sheet steel can be reduced better than fifty per cent (50%) by Planned Unit Loads.
- A Cleveland Tramrail System will handle these planned loads to storage and from storage and through processing at the speed required to become A Pace Maker to Production.

CLEVELAND ALL WELDED CRANES FOR EVERY INDUSTRY



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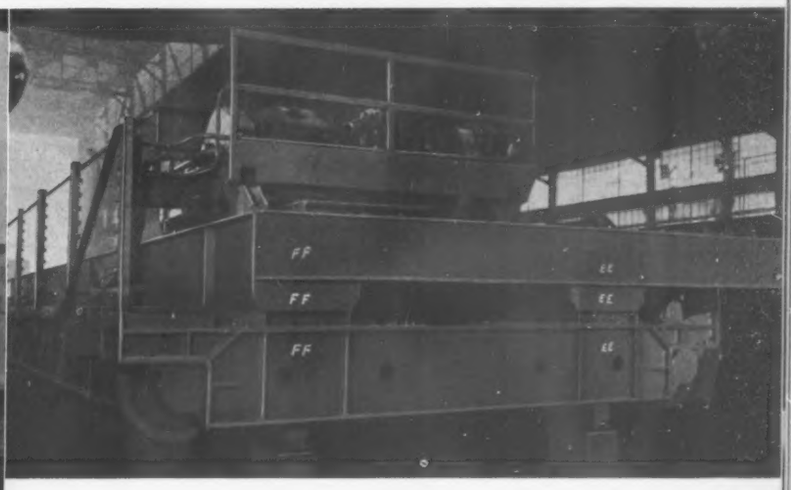


Photo 214

At the left is shown an Equalizer truck of an eight wheel heavy duty crane.

All Welded end Trucks of Cleveland Cranes entirely made "worked" steel, every pound of which is placed where it es the most good.

Less weight, less wheel loads, smaller motors. BUT greater rength more rigidity and increased acceleration.

CLEVELAND CRANES

NEW YORK · DETROIT PITTSBURG · CHICAGO

THE CLEVELAND CRANE & ENGINEERING CO.

1125 Depot St.

WICKLIFFE OHIO

100 pounds of fluorspar to aid in dissolving lumps of limestone which are floating in the slag;

4:35 a.m.—First helper dips out sample of metal from the molten bath and pours a test bar which is sent to the chemical control laboratory located at one end of the open-hearth floor. Here it is drilled and the drillings analyzed for carbon, nickel and chromium. The results are ready in 30 minutes for carbon and in 40 minutes for nickel and chromium. The analysis slip returned to the furnace operator shows: carbon 0.98, nickel 1.26 and chromium 0.24;

5:10 a.m.—Lime boil ceases, indicating that all of the limestone is up from the bottom of the metal bath. The heat now is said to have been melted. The furnace man takes another test bar from the molten metal and sends it to the laboratory to find out the "carbon melt" of the heat. The test bar contains carbon 0.86, manganese 0.47, phosphorus 0.033, sulphur 0.038;

Working Period Begins

5:15 a.m.—Mild, even carbon boil is noted over entire bath. This marks the beginning of working and shaping up period;

5:38 a.m.—Furnace man readjusts flame, dampers and valves for normal working condition of furnace. Flame is softened a little, oil and steam pressure being 85 pounds each. Reversals are made about every 18 minutes;

5:46 a.m.—Second helper shovels 175 pounds of fluorspar in to Nos. 1, 3 and 4 doors to cut lime the floaters which are not completely dissolved in the slag. (Furnace men try to get all of the lime in solution as early as possible in the working and shaping up period of the heat to take advantage of the extra basicity given to the slag);

6:00 a.m. — Test is taken from metal bath for chemical analysis. It shows carbon 0.69, manganese 0.38, phosphorus 0.026, sulphur 0.030, chromium 0.19;

6:15 a.m.—Most of limestone has been dissolved. Slag is creamy. Melter orders the flame softened a little more. He notes that the slag is a bit fluid for this period of the heat, so shovels little raw dolomite into it to thicken;

7:03 a.m. — Another test bar is sent to laboratory. Latter, in 30 minutes, reports carbon 0.55, manganese 0.34;

7:25 a.m.—Good, even and somewhat vigorous carbon boil continues. Furnace man softens the flame as the bath shows a tendency to become overly hot. From this point on, the first helper, besides watching his flame reversals in the regenerative cycles, also maintains a watch-dog attitude over his furnace to see that the proper temperature of the molten metal is maintained. Temperature to a large extent controls the rate of oxidation. The value of a furnace man lies mainly in his ability to judge temperature. Besides the skilled eye, other guides are vigor of carbon boil, consistency of slag, sweating or dripping of silica from the roof bricks, pouring of molten metal from a test spoon;

7:58 a.m.—Test for the laboratory shows carbon 0.43, manganese 0.32, chromium 0.16, nickel 1.26;

8:30 a.m.—Test for laboratory returns carbon 0.36, manganese 0.29, phosphorus 0.018, sulphur 0.023, chromium 0.16;

8:40 a.m.—Slag okay, creamy. Metal temperature okay as indicated by spoon pour test;

8:58 a.m. — Final metal test is taken for chemical analysis. Heat is ready for deoxidation. Slag is creamy and quiet, with all of the limestone dissolved;

9:00 a.m.—1000 pounds spiegeleisen thrown into the molten bath;

9:06 a.m.—Boiling action of bath has been cut considerably;

9:11 a.m. — 1500 pounds spiegeleisen thrown into bath;

9:14 a.m.—Boiling action has been stopped almost completely over the entire bath surface. (Manganese in the spiegeleisen combines with part of the ferrous oxide content of the molten steel, converting part of it to manganese oxide, rendering less of the iron oxide available for the carbon boil. The rate of carbon drop is greatly retarded by this action which is referred to by furnace men as "blocking the carbon");

Oxidation Completed

9:18 a.m.—2500 pounds of silicon pig dumped into bath from charging pan. (This completes the principal part of the deoxidation carried out in the bath. Silicon being a more vigorous deoxidizer than manganese, see Fig. 12, takes up more iron oxide dissolved in the metal, completely stopping the carbon drop and removing about half of the iron oxide. In addition to deoxidizing the metal the silicon serves to hold the carbon constant so that the melter will have no difficulty in hitting the heat's carbon requirements);

9:21 a.m.—1320 pounds of 80 per cent ferromanganese are added to the practically dead bath, to meet the manganese requirements;

9:24 a.m.—2780 pounds of high carbon ferrochromium added to meet the chromium requirements;

9:25 a.m.—Final test returns to melter from laboratory shows carbon 0.29, manganese 0.29;

9:28 a.m. — Melter sends second helper behind furnace to dig out taphole. Makes final calculations for ladle additions to heat;

9:37 a.m.—Metal starts out of taphole into ladle; bath still is dead from deoxidation by silicon, manganese and chromium additions;

9:41 a.m.—Floor gang shovels in following additions to molten metal as it runs into ladle: 140 pounds 80 per cent ferromanganese, 800 pounds 50 per cent ferrosilicon and 160 pounds stick aluminum;

9:46 a.m. — All metal has been drained from furnace; metal and slag are very quiet in the ladle. Pyrometer reading of tapping temperature reported to melter as being 2965 degrees Fahr.;

9:49 a.m. — Ladle with molten metal, 119 tons, is lifted and transported across pit and nozzles are centered over the first two of a string of molds lined up on the tracks in front of No. 2 pouring platform preparatory to teeming;

Teeming Starts

9:52 a.m. — Teeming is started, double stoppered ladle being used. Chemical analysis test ingots are taken of molten steel at the first, twentieth and fortieth ingots poured. The metal fills forty-five 21-inch, 12-sided, inverted molds;

10:27 a.m. — Pouring of heat is finished. Ingots are allowed to solidify after which they pass on into the blooming mill for reduction to billets which are subsequently conditioned and tested metallurgically; after the heat has been okayed it is rolled into bars.

The analysis range of the heat originally was scheduled at 0.35 to 0.45 carbon; 0.65 to 0.80 manganese; 0.040 phosphorus; 0.045 sulphur; 0.15 to 0.25 silicon; 1 to 1.50 nickel; 0.65 to 0.90 chromium.

The aim given to the melter was 0.38 to 0.42 carbon; 0.65 to 0.75 manganese; 0.30 phosphorus; 0.030 sulphur; 0.20 silicon; 1.25 nickel; 0.75 to 0.85 chromium.

Analysis obtained was 0.40 carbon; 0.70 manganese; 0.018 phosphorus; 0.023 sulphur; 0.18 silicon; 1.24 nickel; 0.81 chromium.

Total weight of ingots obtained was 266,000 pounds and the metallic yield was 90.5 per cent.

Deep etch tests made on the billets proved the heat to be metallurgically sound. McQuaid-Ehn grain size test made on billet samples made from the first and twentieth ingots poured showed a No. 6 grain size bordering on a No. 7, and normal. Inclusion tests were rated at 2.95. The heat was accepted in the mill for crankshafts and the billet yard was given the okay to roll billets into 3¼-inch squares. Fig. 10 shows a log graph of the heat.

(To be concluded)

POWER DRIVES

Special Maintenance Men Should Install All Metallic Belt Fasteners

THE popularity of metallic belt fasteners of various types is well deserved by the ease and simplicity with which they may be applied. For this same reason the policy is sometimes adopted of permitting anyone to take-up belts. Sometimes this practice does not lead to the best results.

Even though the fastener manufacturers provide complete and thorough instructions the man who does this work only occasionally probably does not even see them. Nor does he appreciate the real requirements of a good belt connection. To him, for some types of fasteners, the task appears to be simply to cut out the old fastener, insert the end of the belt in the jaws of a new fastener and close with a hammer. Other types require him to operate a lever to close.

But installing fasteners properly is more than that. First, only a man with experience knows how much belt to cut out without leaving it too loose or making it entirely too tight. Also, unless the ends are cut square and the fastener applied squarely the tension is not distributed evenly over the width of the belt, causing the belt to run out of true or causing part of the belt to carry more than its share of the load.

Another common mistake is to use fasteners of the wrong size for the width or thickness of the belt. Under heavy load these pull out or open. Sometimes even experienced men are forced to use fasteners of incorrect size because of a false attempt to economize by not carrying the necessary range of sizes in stock.

Plant managers have profited by turning all belt work over to special men who make regular rounds of the plant, inspecting and servicing all belts requiring attention. These men are subject to call on the automatic signaling system in case of an emergency, but where belts are serviced regularly few emergencies occur.

Shortening endless belts requires much more skill and experience than applying metallic fasteners and should be intrusted only to trained men. Small and even medium-sized plants will generally be ahead to turn such work over to the belting supply house or to concerns specializing in millwrighting or maintenance. These men are not only more experienced but have a direct responsibility in the reliability of their work.

♦ ♦ ♦

Shafting on Light Trusses

SOMETIMES it is necessary to install machine tools in buildings not originally constructed for manufacturing purposes. For example, in cities public garages are often used by small plants or for overflow production work. In such cases the roof trusses often are of wooden or light steel construction and not designed strong enough to support lineshafts. Therefore, individual motor drive is generally considered necessary.

One plant which made such a move was able to continue its lineshaft group drive in the new location at a minimum of installation expense. The roof trusses were only 10 feet from the floor; therefore the superstructure for the lineshaft was placed on top of the lower chord of the roof truss and the lineshaft hangers inverted to mount like floorstands on top of the stringers. The longer centers thus obtained provided a better belt drive than obtainable by dropping hangers, which would have located pulleys too low to be safe.

The trusses were reinforced by erecting posts approximately at their centers, but placed where they were entirely out of the way even though not exactly in line. This provided a truss construction even stronger than originally.

The machines were divided into five lineshaft groups each with its motor. The installation cost was several thousand dollars less than if each machine had been rebuilt for an individual motor plus the cost of extra motor, starting equipment and wiring.

♦ ♦ ♦

When motors are installed on pivoted motor bases it is not necessary to purchase slide rails. This saving pays a considerable proportion of the cost of the pivoted bases for motors of the smaller horsepower rating. One plant manager states that the saving in belt because of the short center paid practically all of the remaining difference.

♦ ♦ ♦

Standardized layouts of groups of grinding and polishing units has proved economical in an Eastern plant. These groups are laid out in units of 12 machines, or the equivalent. Thus the motors driving the lineshaft and also those on the exhaust fans are duplicate units and require only a single "spare" of each in stock.

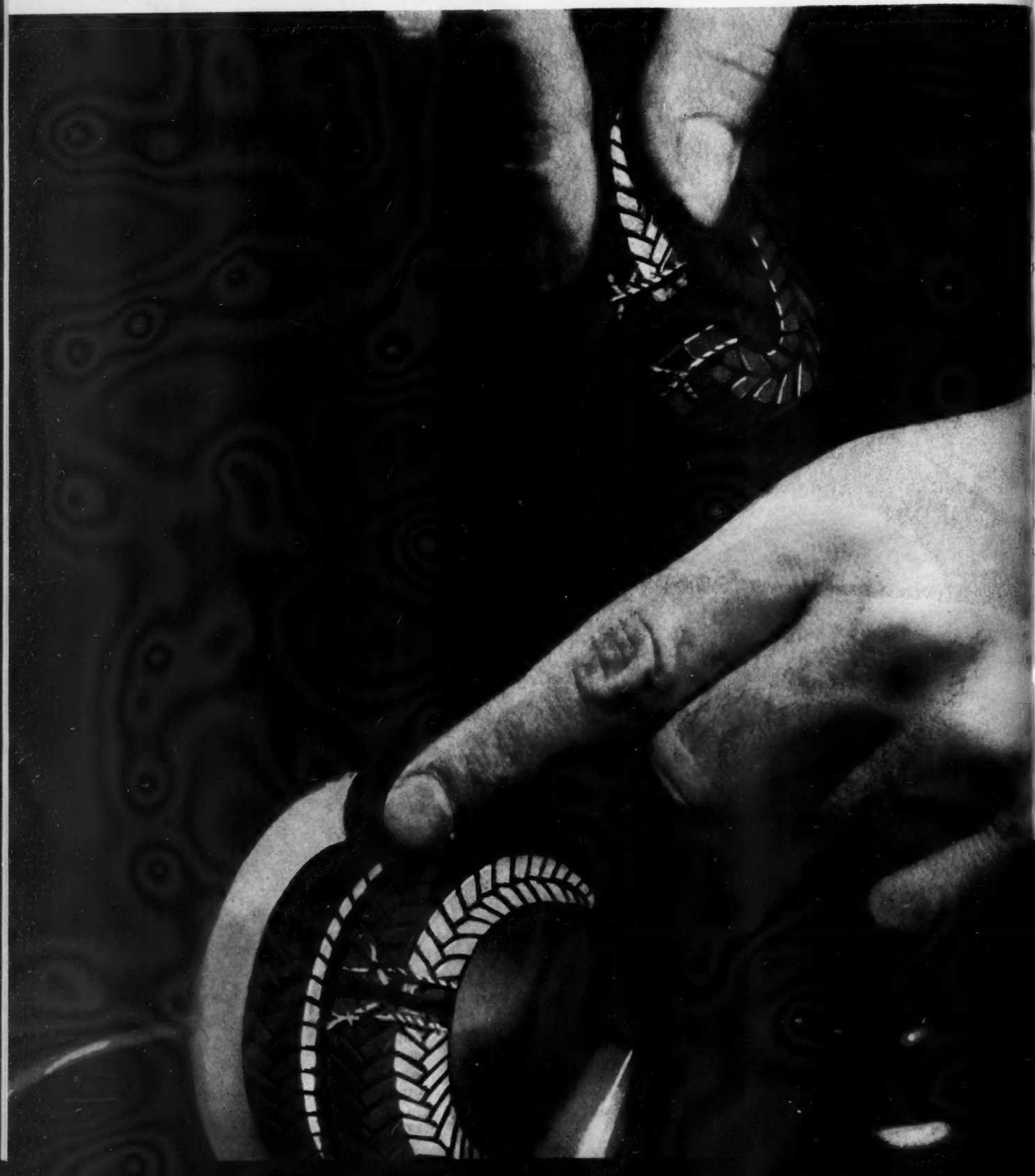
♦ ♦ ♦

Pillow blocks with ball bearings for radial load and roller bearings for thrust load are available for shaft diameters from 3 5/10 to 10 inches and radial load capacities up to 250 tons. The bearing is designed for oil lubrication.

♦ ♦ ♦

Pillow blocks with antifriction bearings, mounted in rubber or in cork to absorb sound and vibration, are available for the smaller size shafts.

U-S- CENTRIFUGAL PUMP PACKING



1 STAYS SOFT AND PLIABLE 2 DOES NOT CUT SHAFTS 3 LESSENS WEAR 4 REQUIRES FEWER ADJUSTMENTS

WHERE THE WHOLE JOB DEPENDS ON PACKING

Shown here is a battery of centrifugal pumps that supply thousands of gallons of water per hour to the breaker of a great coal mining company. On U. S. #193 Packing — a coil of which appears on the right of photo — falls the task of keeping these pumps in efficient, 24-hour operation.

SPEED PRODUCTION... CUT COSTS...FIT EVERY CENTRIFUGAL PUMP JOB WITH SCIENTIFICALLY DESIGNED U. S. #193 PACKING!

STRONGEST long fiber asbestos yarn... exclusive U. S. Rubber plaiting process ...proper density...thorough lubrication... and graphiting! These are the physical elements that proof U. S. #193 against water, steam, oil, weak acids, and brine...that prevent hardening with age or burning out under high heats and speeds.

But into each coil and ring of U. S. #193 are woven other elements that bear no price tag, appear on no specification sheet. Unseen and intangible, these are the vital ingredients that cut costs, eliminate waste, speed production, and safeguard the investment of the purchaser. They are the matchless skill and special knowledge of the great company of our scientists and engineers... the experience of three decades of research and craftsmanship in the manufacture of packings for industrial uses... the constant sample testing of U. S. Packings in laboratory, plant, and field... and an unchanging adherence to the ideal of quality.

That is what we mean when we say that U. S. Packings have built into them Service Beyond Price and Specifications.

SERVICE BEYOND PRICE AND SPECIFICATIONS

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United States Rubber Company

United States Rubber Products Inc. New York N. Y.

SURFACE TREATMENT AND FINISHING OF METALS

Design, Finish and Mechanical Perfection Impart Sales Appeal to Modern Bicycle

Striping of frames is a hand operation which can be done only by skilled operators

REVIVAL of bicycle trade and competition of manufacturers to capture the active market have led to developments and improvements which have made the modern bicycle far superior to its predecessor, so popular at the turn of the century. Modern metallurgical, welding and forging practices have combined to produce a machine stronger and more mechanically perfect than ever before.

Full advantage has been taken of flowing lines, brillant colors and chromium plate to impart sales appeal to the finished product, and straight-line production methods have cut costs so that the modern bicycle with all its improvements can be purchased at a price below that in 1906, the peak bicycle production year. Statistics show about 1,500,000 bicycles were produced in that year while in 1936, the best year since, production was under a million.

Methods used by Cleveland Welding Co., Cleveland, are typical of improved practice in bicycle production and are described here. This company manufactures three lines of bicycles, the Standard line to satisfy the demand for a low cost machine; the DeLuxe line which falls in the medium price bracket; and finally the Supreme line which is styled and equipped to capture the market for the highest grade bicycle. These bicycles are the product of close co-operation between industrial designers, engineers, metallurgists and finishing engineers to combine beauty, mechanical perfection and the strongest materials into one harmonious ensemble.

Frames are fabricated from high tensile, electric welded steel tubing which is purchased on rigid specifications. The tubing must be capable of withstanding swaging, flattening

Synthetic enamel finishes are baked in the conveyor type oven shown here. The line of small tables and chairs are for stripers who receive parts as they come from the oven. After striping parts are hung on the conveyor and carried to the assembly room

Silverlink

T. M. REG. U. S. PAT. OFF.

THE ROLLER CHAIN THAT'S BUILT FOR SERVICE —AND GIVES IT!

● Silverlink is a product of research and experience—an accomplishment of the leading manufacturer of chains. It is the superior finished steel, accurately pitched, roller chain for moderately high speed power transmission. It is also extensively used as a conveying medium.

Silverlink is made in ⅜" to 2½" pitch, in single and multiple-strand types, with a complete range of sprockets and attachments. Complete drives — Chains and Sprockets—from ¼ to 225 H. P., in speed ratios of 1 to 1, up to 8 to 1, are stocked by distributors, nationally. Send for Book No. 1557. Address Link-Belt Company, Indianapolis, Philadelphia, Chicago, Atlanta, San Francisco, Toronto or any of our offices located in principal cities.

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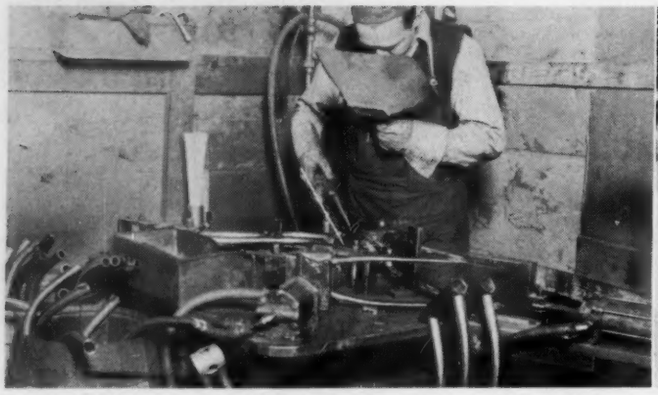
LINK-BELT

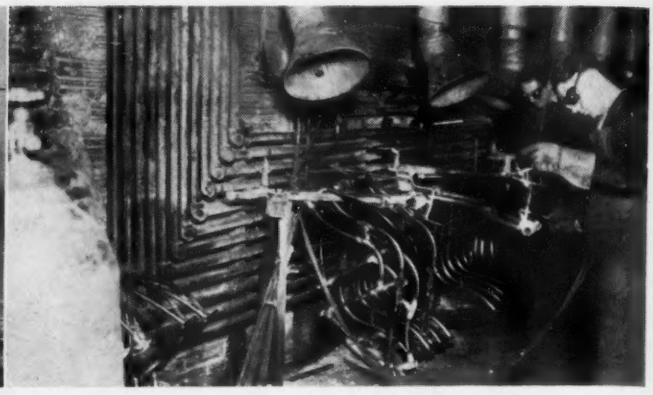
Builders of

THE COMPLETE LINE OF POSITIVE DRIVES

Silent Chain Drives • Roller Chain Drives • Variable Speed Transmissions • Herringbone Gear, Worm Gear, and Motorized Speed Reducers



Frame members are assembled in specially designed jigs and tack welded in place



Tack welding is followed immediately by torch brazing, filling in all corners with an excess of metal

and forming operations without the necessity of preliminary annealing, thus retaining and taking advantage of the increased strength induced by work hardening. Specifications have been carefully worked out to obtain maximum strength in all frame members. In forging the cranks, for instance, precautions have been exercised to eliminate local stresses, particularly surface stresses. These cranks will withstand a transverse load in excess of 1000 pounds.

Welded Joints Are Reinforced

After all frame members have been fabricated they are assembled in jigs which hold them in position while they are tack welded in place. This is an arc welding operation as shown in an accompanying illustration. All tubing is reinforced at the welded joints by tight fitting tubular inserts. Immediately after tack welding the frames are torch brazed, filling the corners with an excess of metal which is later ground away to form a continuously rounded surface.

Front forks, which are an electrically welded assembly of steel forgings, swaged tubing and machined parts, are designed to give maximum strength with light weight. Formerly these forks were a brazed assembly. As a result of the change from brazed forks to the use of specification material, electrically welded, the yield point of this member was increased from 580 pounds to 1000 pounds, transverse load. The yield point of rear fork members was increased from 2000 to 3000 pounds. The strength of the frame has also been increased materialy. At the present time this company is experimenting with a new type of electric resistance welding which promises to increase the strength of the frames even further.

Completed frames are then sent to the final inspection room where the head and crankcase are reamed after which the frames are trued in a specially designed jig. Following this operation they are sent to the finishing department.

Wheels, cranks, sprockets, handle bars and other parts manufactured in other sections of the plant all converge in the finishing department which is divided into four sections—rustproofing, buffing and polishing, enameling and electroplating. Frames, wheel rims and other parts finished in enamel are all rustproofed and kept in stock until needed.

Enameled parts are finished only upon order. When an order comes through specifying color, frames and other parts are taken from stock and finished with one coat of high grade synthetic enamel which is baked in an electrically heated conveyor oven. When the parts emerge from the oven they are routed to stripers or to spray booths where a trim is applied.

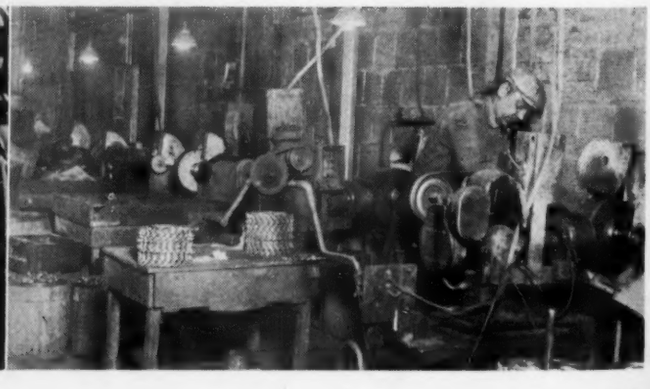
Trim Applied with Masks

Application of the diamond shaped and triangular trim seen on bicycle frames is worthy of special notice. Tubular brass masks which expose only the parts to which the trim color is to be applied are clamped around the frames and the trimming lacquer is applied by spray. The lacquer is allowed to dry for two or three minutes after which the masks are removed and placed on other frames. The entire operation is simple and rapid and the trim is identical on all frames. The trimmed frames then travel to the stripers. Fenders, tanks, wheels and other parts also are striped, using mechanical means wherever practicable. Completely finished parts are hung on a conveyor which carries them directly to the assembly de-

(*Please turn to Page* 96)

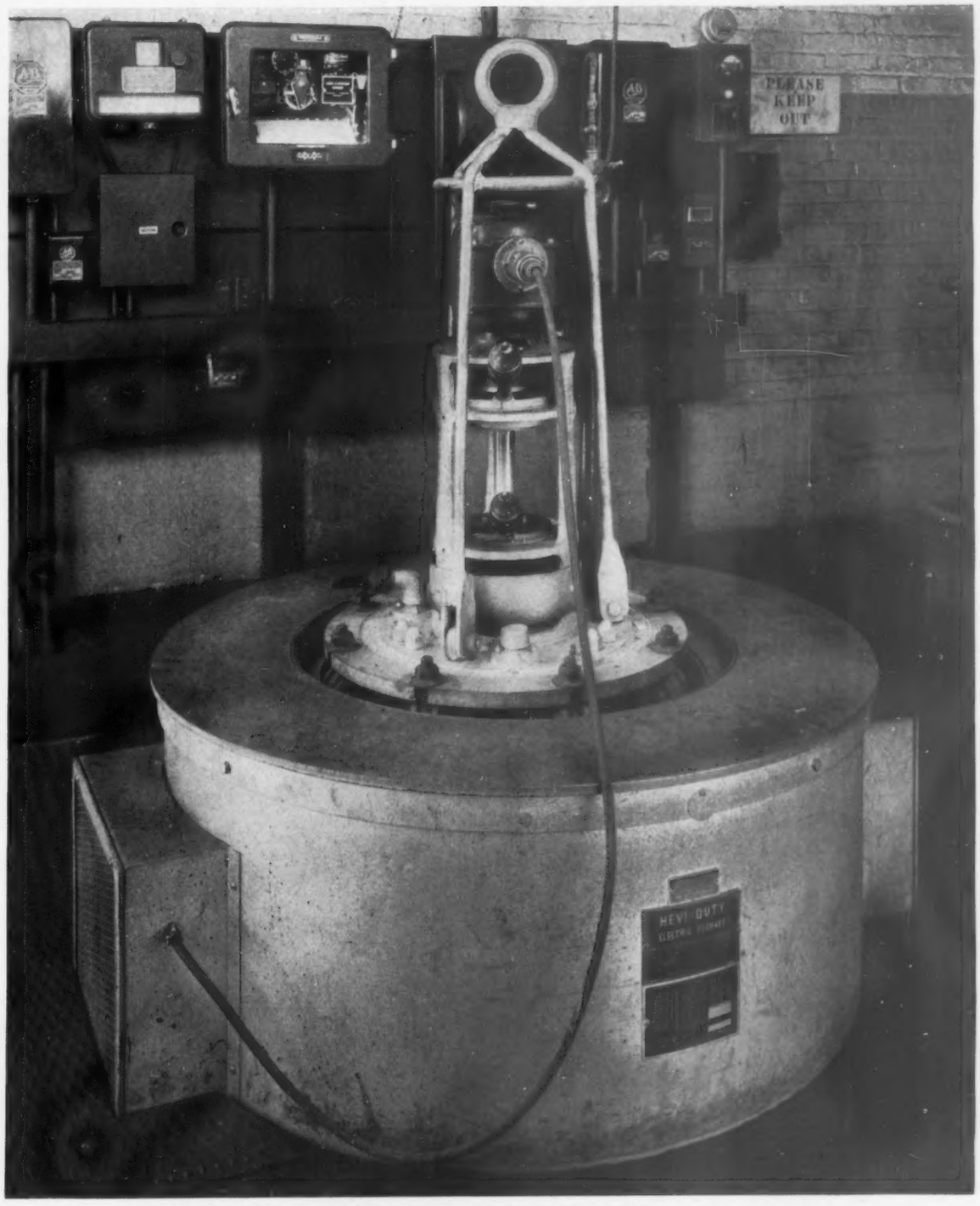
Tubular brass masks assure application of uniform trim on all frames. Masks are applied and removed by an assistant to the sprayer

Polishing of sprockets is carried out on semi-automatic machines so that polishing lines are radial with the work circumference



Electric Carburizing Saves

time - money - floor space



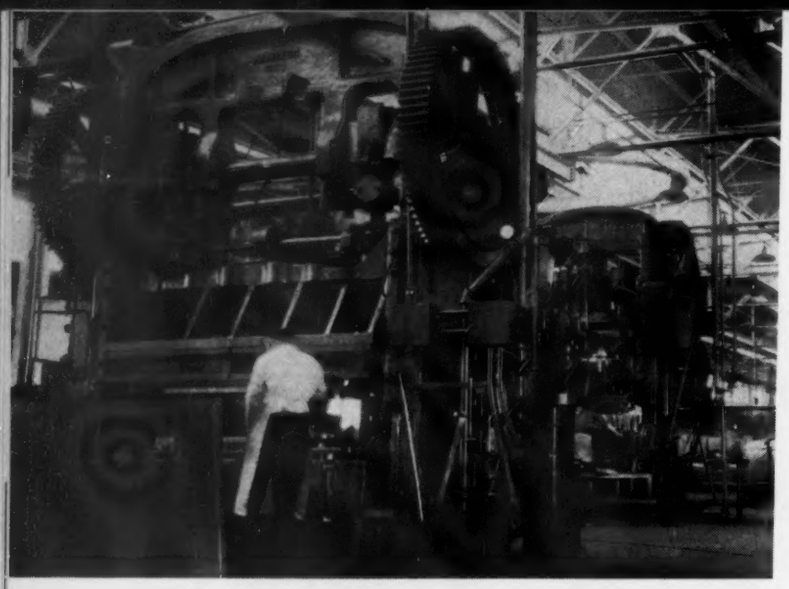
An HD-1225 Hevi Duty Electric Vertical Retort Carburizing Furnace in the Plant of the Stewart-Warner Corporation, Chicago

HEVI DUTY ELECTRIC COMPANY

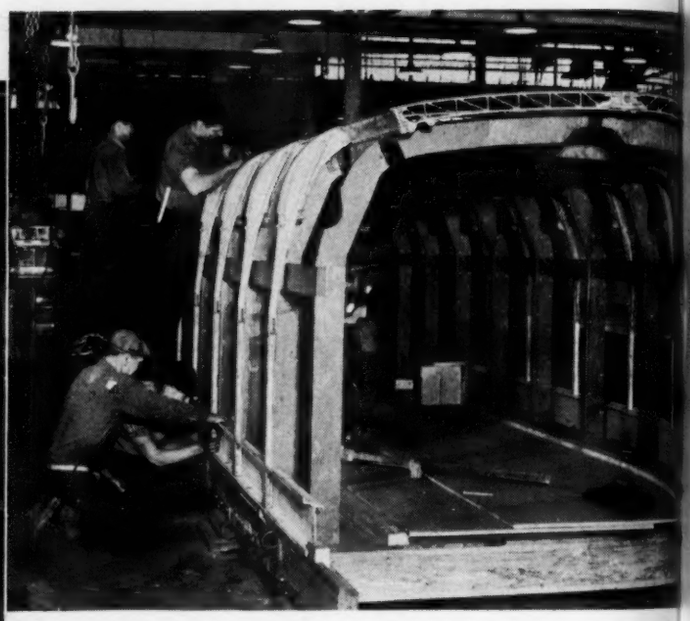
HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

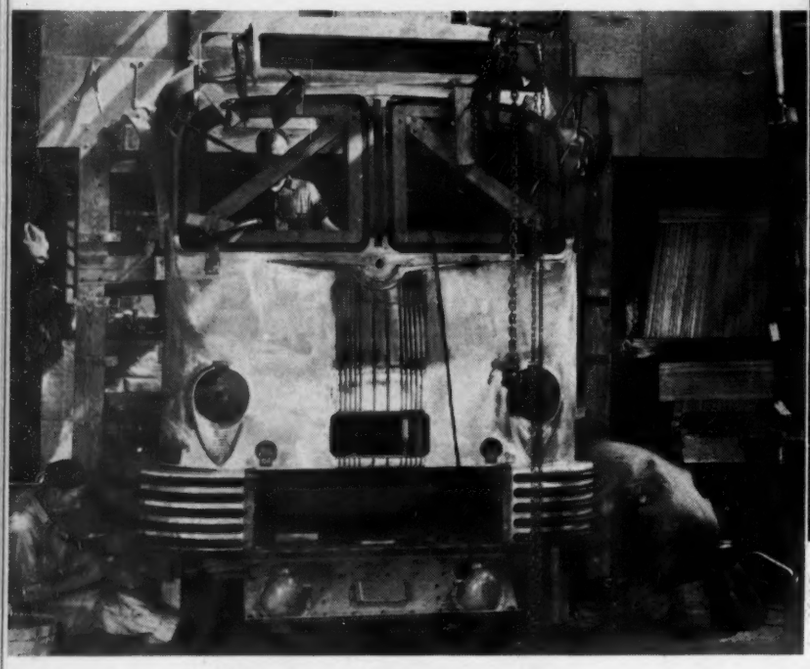
MILWAUKEE, WISCONSIN

Behind the Scenes at Plant of Bus and Truck Manufacturer



WIDE RANGE OF SHEET STEEL PANELS is formed on these presses for use in coaches and trucks. Some sheet duralumin parts are formed to proper shape by moving the sheet back and forth under a small stationary air hammer with head and anvil of correct contour

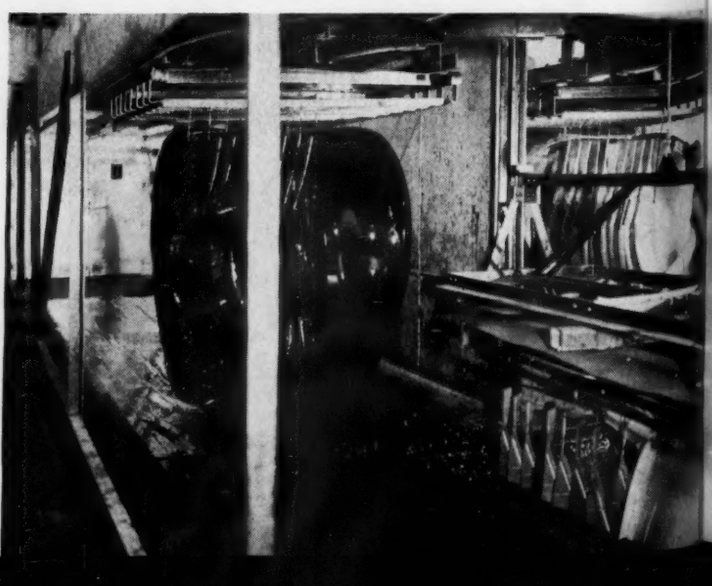




COMPOSITE BODY SECTIONS of the coaches are built on large stationary steel fixtures as at left; a number of these precede the main assembly line. Above is shown preliminary assembly work on a bus side and top frame. Overhead monorail system serves this department

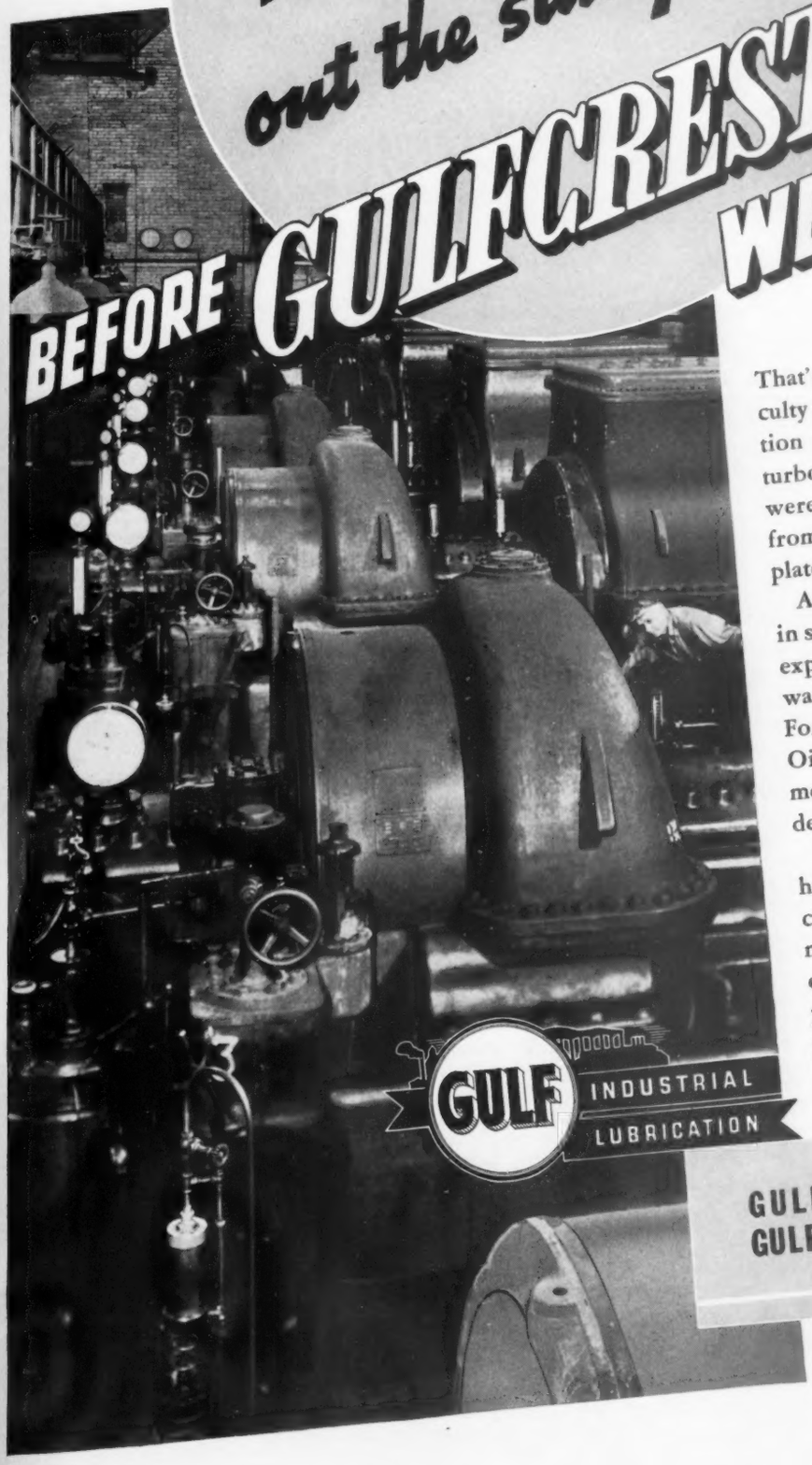
PRODUCTION OF MOTOR COACHES is mounting rapidly as metropolitan bus transportation gains favor. On this page are some views of operations at the plant of General Motors Truck Co., Pontiac, Mich., where large numbers of trucks, taxicabs and coaches are assembled. New buses feature all steel and aluminum bodies, chassisless construction, forced ventilation and rear engines.

At the right are several groups of fenders and cowls, those at the extreme right having been washed and dried preparatory to dipping in the japanning tank in the foreground. The group at the left has been dipped and is proceeding through a gas-heated oven of the forced convection type. Two coats of japan are applied, necessitating a double-compartment oven



They shoveled out the sludge . . .

BEFORE GULFCREST OIL A WENT IN . . .



That's literally a fact! So much difficulty was encountered in the operation of this great installation of turbo-blowers that the plant people were forced to remove the sludge from the oil reservoir in the bedplate with a shovel.

After Gulfcrest Oil A was placed in service — as recommended by an experienced Gulf engineer — there was no further sludging of the oil. For the past three years, Gulfcrest Oil A has lubricated this equipment at high efficiency and without delays due to lubrication difficulties.

The use of Gulf quality lubricants has set up new standards of efficiency in many leading steel and metal working plants. Ask a Gulf engineer how the lubrication of your equipment can be further improved. He will be glad to give you the benefit of his broad experience.

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Better Choice of Materials And Improved Lubrication Reduce Wear of Metals

THAT much has been accomplished in reducing wear of metals was revealed at a symposium on this subject held in Philadelphia, April 5, under auspices of the Philadelphia district committee of the American Society for Testing Materials. Better selection of materials for the purposes required, redesigning of equipment in many cases, improved lubrication and closer study of the general operating conditions have contributed to this advancement through observation based on experience and refined methods of laboratory testing.

Wear of metals was discussed from various viewpoints—railroad, automotive, power equipment and textile industry, with Dr. H. W. Gillett, metallurgist, research laboratory, Battelle Memorial institute, Columbus, O., first presenting general aspects of the problem, and D. E. Ackerman, metallurgist, research laboratory, International Nickel Co. Inc., Bayonne, N. J., contributing a paper on some important variables in wear tests on cast iron. Two sessions, both well attended, were devoted to the symposium.

Time Must Supply Answers

While much has been achieved, the general study of wear and methods of combating wear still has a long way to go. This was emphasized particularly by Dr. Gillett, who believed that time, and time alone, would have to supply answers to many of the present problems.

"We are, broadly speaking," he said, "still far from being able to predict ahead of time, with the assurance required for reasonable engineering precision, what the relative lives of two competing metals will be in service and we especially lack the ability to put a new alloy, on which service experience is lacking, into its correct position in a list of wear-resistant alloys on the basis of some laboratory test."

Early in his discussion, Dr. Gillett defined his conception of wear. "Wear of a metal part," he said, "is its undesired gradual change in dimensions in service under frictional pressure." This, he explained, draws no hard and fast line between the first stage of wear, involving mechanical deformation, and the removal which follows. It admits such failures as those of battered rail ends and wiped bearings even should the dimensional change occur without loss of weight, as long as the failure occurs gradually.

Breakage Is Not Wear

Such failures as the chipping of a too brittle cultivator tooth when it strikes a stone are not classed as wear, he believed, for the causes and remedies of such failures are different. Gradual chipping or spalling on a micro-scale would be classed as wear. Intentional removal as in machining or grinding is excluded, though there is a fairly close analogy, he asserted.

Continuing, he said that the action of corrosion, concomitant with abrasion, cannot be wholly divorced from wear, and, just as mechanical deformation of the surface may precede removal, so may chemical change of the surface be followed by removal of corrosion products and the corroded layer.

Numerous examples of wear were cited and this was followed with a discussion of the mechanisms of wear. Wear of a metal by another, Dr. Gillett declared, usually occurs in one of two ways. In one, asperities on the surface of one catch on asperities of the other, or penetrate to form mating asperities and then particles of one or both mates are torn off in a fashion analogous to machining. In the other, he explained, the mating metals come into molecular contact, adhere under existing pressure by a sort of welding and are then torn apart with particles of one adhering to the other.

He said it was important to know what happens to the metal debris resulting from wear, and to extraneous grit. This loose material may be swept off into the lubricant, or it may embed itself into one of the parts and act as a lapping medium. He also pointed out that the manner in which the particles wear off, whether by splitting along cleavage planes or individual crystals, or by tearing out of whole crystals along grain boundries, has its influence on the type and rate of wear.

The work of hardening of the surface is of undoubted importance, he stated. The flow of metal tends to remove asperities and to produce a more nearly mechanically perfect surface. The hardening tends to resist the entrance of the asperities on the mating surface or of extraneous grit. He pointed out, however, that work hardening is accompanied normally by loss in toughness, so that brittle spalling of the worked surface may ensue.

Many Factors Involved

Wear testing has to determine the resultant of many factors, some of which can be measured, some only named. He said that even if it were possible to evaluate all of the factors quantitatively there would still be difficulty in weighting their importance in a given service. For instance, he stated, hardness is of major importance and usually is the outstanding property against which wearing properties may be plotted to show some reasonable graduation, yet even this rule breaks down so often and so completely, as in the case of cast iron, that "it must be taken only as the opening chapter of the whole story."

Discussing simulated service tests, he said the most reliable, although the most expensive, are those that place a full-size piece of the equipment concerned into the laboratory and put it to actual use under known and recorded conditions.

Efforts to develop a standard wear test at this time would not prove profitable, he believed. An understanding of the mechanism of wear in a particular service is perhaps the best guide to a satisfactory test, he contended, adding that more attention to the fundamental mechanisms of wear and to designing apparatus that reproduces the particular ones that hold in the service in question will be more fruitful than will the "blind adoption of some 'standard' wear test that does not truly represent the case."

Experiences gained in the course of a program to develop a laboratory test which would yield reasonably

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MANUFACTURER'S TRADE MARK YOUNGSTOWN WIRE

reliable indications of the level of wear resistance of different cast irons and to apply this test to commercial cast irons were contained in the paper prepared by Mr. Ackerman.

A technique was devised in which proper control caused a series of runs of short duration to approximate a continuous, long-time test, and the machine used was a standard Amsler unit modified in one or two respects. Gray iron and plain chilled and nickel-chrome chilled iron were among the types of specimens experimented with.

Temperature measurement and temperature control, oxide formation and torque characteristics, and prevention of friction oxidation were among a number of phases discussed. Comparative tables and much similar data were presented.

Limited Data Available

Mr. Ackerman spoke of the paucity of data as to the real nature of wear, and, in line with Dr. Gillett, indicated that it seemed unlikely that a testing machine satisfactory for general purpose use can be devised. "For the present," he warned, "wear tests must be conducted with great care and the results of such tests must be interpreted with caution."

Much redesigning of equipment and many changes in materials and finishes have been made by machinery builders in their efforts to meet the especially complicated problems of wear in the textile industry, according to Albert Palmer, Crompton & Knowles Loom Works, Worcester, Mass.

Mechanical changes, he said, have been made in the interest of reducing shock loads, increasing bearing areas, providing more accurate assemblies, improving running fits of parts, providing locking devices to eliminate maladjustment resulting from vibration, and making provisions for better lubrication, the latter including the proper placing of oil grooves and lubrication fittings, as well as the selection of suitable lubricants.

With respect to finishes, Mr. Palmer stated that through new designs and use of new machine tools, the parts are assembled more securely and accurately and have finished surfaces at the points where relative motion takes place.

The change in materials is indicated by the fact that one textile machine was more than 90 per cent gray iron, whereas in recent years this amount has decreased markedly in favor of a few cast iron alloys and steel of various grades. These grades, the speaker declared, range from low carbon varieties, which are used for structural steel and ordinary machinery steel, to the higher carbon and alloy steels, which respond to a multitude of necessary heat treatments.

The recent trend in alloy cast irons, he said, has been toward the use of such elements as chromium, nickel and molybdenum. Materials of various characteristics are employed, some because they are denser and stronger than regular gray iron, some because they are tougher and more resistant to impact, and some because through heat treatment they can be made as resistant to abrasion as chilled gray iron.

Mr. Palmer cited numerous examples as typical of problems of wear in the textile industry, with natural variations according to type of equipment. For instance, he said, in preparatory machinery such as openers, pickers or cards, the wear problems result from high speeds combined with weight. In slubbers, roving frames, spinning frames and twisters, high speed and small bearing areas are involved. In warpers, high speed, great weight and sudden stopping are the source of difficulty. In slashers, the speed is low, but weight and high temperature are present.

The wearing effect of these inherent characteristics is increased greatly, he said, by the conditions under which the machinery must operate. There is the extra humidity necessary to forestall practically insurmountable difficulties with the fabrics. Lubrication is especially complicated because of the danger of oil spots on the fabric. Lint from the yarns complicates cleaning, and, in turn, the wear problem.

Lubrication Is Recommended

Recently concentrated attention has been given to lubrication, he said. At Crompton & Knowles Loom Works, for instance, a laboratory study has been made with a view to establishing specifications for the various lubricants required for looms. These, with the tradenames of the products, are supplied to the textile mills. Also a chart is sent with all new machinery showing the frequency with which the main bearings should be lubricated, he asserted.

N. L. Mochel, metallurgical engineer, Westinghouse Electric & Mfg. Co., Philadelphia, discussed several interesting examples of wear on power equipment and means for combating such action. He referred to some laboratory tests which have been particularly effective, including an erosion test that has given excellent service, he said, in predicting the life of turbine shield and blade materials in service.

In steam turbine construction wear problems have resulted in various changes in the materials used. Shields for turbine blades, as now used by Westinghouse, are No. 6 Stellite, of the following composition: Cobalt, 55 per cent minimum; chromium, 27-33; tungsten, 3-6; and other elements, 6.5 per cent maximum. Sealing strips, formerly of brass, are now, with the higher temperatures employed, a low carbon 13 per cent chromium steel, containing 0.5 per cent molybdenum. Heat treated high carbon chromium steel, having 1.70 carbon and 18 per cent chromium, with a Rockwell C hardness of 43 is now standard material for steam inlet valves and low carbon 13 per cent chromium steel, sometimes stellited at the point of contact, is being used for the valve seats.

For throttle valves, the use of nitrided steel bushings with stems of either 20 per cent nickel—7 per cent chromium steel or low carbon 12 per cent chromium steel gave satisfactory results for years, but today higher temperatures have forced the development of new combinations, Mr. Mochel said.

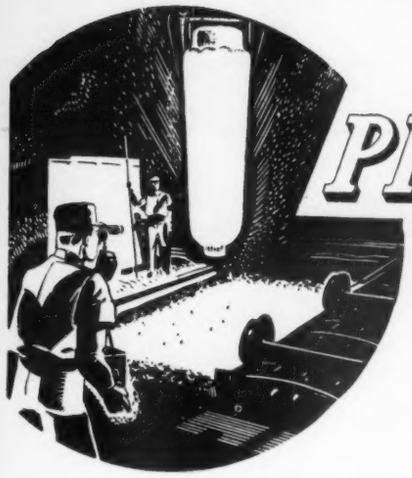
Tests Suggest Changes

A laboratory set-up for testing valve stems and bushing materials under steam conditions very closely approximating service conditions has been valuable in indicating the necessary changes, he added.

An interesting and important item of wear in the hydraulic turbine, he said, is the serious pitting of the blades in the turbine runner by what is known as cavitation attack. Runners usually are made of ordinary cast steel and the repairing of the pitted areas by arc welding over with 18-8 chromium-nickel steel has led to excellent results, he stated.

Higher operating speeds for railroad equipment have stressed the need for greater wearing materials, according to L. W. Wallace, director, equipment research division, Association of American Railroads, Chicago, who described tests on rails, locomotive car wheels and certain other equipment parts. G. H. Clamer, president and general manager, Ajax Metal Co., Philadelphia, presented an interesting review of tests on journal bearings, going back a number of years to a presentation he made before the Franklin institute, Philadelphia, in 1903.

Results of a series of tests on automobile connecting rod bearings, gears, cylinder bores and piston rings were submitted by W. E. Jominy, metallurgical department, research laboratories section, General Mootrs Corp., Detroit. He gave considerable detail with respect to testing equipment used and the nature of the wear. Among points emphasized was that coarse-grained cylinders resist wear much better than those of fine grain. The larger grained iron holds oil film better and there is a lower modulus of elasticity, he suggested.



PROGRESS IN STEELMAKING

Backing Up Refractories with Insulating Material—I

BY G. E. GRIMSHAW
Manager Industrial Insulation Department, Johns-Manville, New York

INDUSTRY for many years has recognized that insulation in back of the walls and roofs of most furnaces and other metallurgical equipment is necessary to save fuel even though fuel may be inexpensive. In the majority of cases insulation used for but that one purpose is a sound investment and pays good returns.

Many other reasons are advanced for backing up refractories with insulation. Engineers concerned with problems of heat transfer as they relate to the economical operation of furnace equipment, will find it advantageous to make a study of some of these other reasons, for the savings accomplished often exceed the saving in fuel. A few of these are as follows:

1. Produces more uniform furnace temperature.
2. Allows use of thinner refractory walls.
3. Reduces air infiltration.
4. Increases life of refractory.
5. Reduces temperature drop in gases carried in flues and mains.
6. Reduces temperature of wall casing.

Since products are more uniform with less rejects due to more uniform temperatures, thinner walls reduce the length of expensive alloy rolls in continuous furnaces and, since increased life of refractories means an increase in the number of heats in an open-hearth furnace, it can be appreciated that savings other than in fuel are of major importance.

Insulating materials used for backing up silica brick, fire clay brick or insulating firebrick consist of block, brick, powders, granules or cements. A brief description of their composition is as follows:

BLOCKS

1. Calcined diatomaceous silica, asbestos fiber and collodial clay.
2. Expanded vermiculite and clay.
3. Mineral wool and asbestos fiber.

BRICK

1. Diatomaceous silica sawed from the natural deposit.
2. Diatomaceous silica molded and calcined.
3. Inert mineral fiber and clay mixed and burned.
4. Diatomaceous earth brick made with ground cork filler which is burned during the firing of the brick.
5. Siliceous kaoline brick made with sawdust or naphthalene filler which is burned during the burning of the brick.
6. Refractory clay and diatomaceous earth brick made by a gas reaction process.

POWDERS

Calcined or uncalcined diatomaceous silica.

GRANULES

1. Expanded vermiculite.
2. Granulated mineral or rock wool.

CEMENTS

1. Expanded vermiculite, asbestos

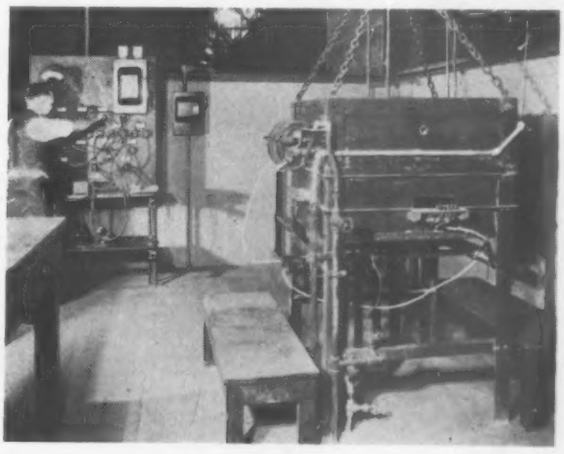


Fig. 1—Weinland high-temperature testing apparatus. Electrical switchboard is shown in the background

Table I

Test Results on Insulating Blocks

	Diatomaceous silica	Vermiculite	Mineral or rock wool
Density lbs./cu. ft.	23-25	17-25	22-24
Modulus of rupture lbs./sq. in.	25-65	15-65	25-43
Compressive strength:			
Load in pounds to compress ¼ in.	45-55	25-90	7-15
Abrasive strength:			
Loss in weight 20 min., %	43-100	65-100	44-100
Linear shrinkage:			
1900 deg. Fahr. soaking heat 24 hrs., %	2.9-3.1	3-5.2	7-10
Temperature limit — deg. Fahr.	1900	1000-1700	1000-1400
Conductivity, mean temp. 1000 deg. Fahr.	0.743-0.828	0.863-1.12	0.721-1.2

fiber and colloidal clay.

2. Mineral wool, asbestos fiber and colloidal clay.

The important physical and thermal properties of these materials are as follows:

BLOCKS

The data on blocks consists of minimum and maximum laboratory test results on four different commercial insulating blocks made from diatomaceous silica, four made from vermiculite and two from mineral or rock wool. These are presented in Table I.

BRICK

Test results given in Table II are based on nine different commercial insulating brick. These are recommended by their manufacturers for use as insulation in back of refractories. Two are recommended for a temperature limit of 1600 degrees Fahr.; four for a limit of 2000 degrees Fahr. also are recommended as a furnace lining for domestic oil burner installations, and in furnaces where there is no flame impingement such as the radiant tube type annealers.

Table II

Test Results on Insulating Brick

Density lbs./cu. ft.	29-40
Modulus of rupture lbs./sq. in.	70-140
Crushing strength (cold) lbs./sq. in.	87-700
*Volume shrinkage—5 hr. soaking heat 2000 deg. Fahr., %	0-14.4
*Linear thermal expansion 1900 deg. Fahr., %	0.46-1.2
Deformation under load:	
Temperature of failure under load of 12.5 lbs. per sq. in. deg. Fahr.	1900-2380
Pyrometric cone equivalent	Cone 23-Cone 29 (2876°F.) (2984°F.)
*Spalling test—number of cycles	2-25
Temperature limit, deg. Fahr.	1500-2500
†Conductivity, 1000 deg. Fahr., mean temperature	1.13-2.19

*Does not include 1600 deg. Fahr. brick.

†Brick sawed from natural deposit has conductivity of 0.79 at 1000 deg. Fahr. mean with heat flow perpendicular to strata.

The values tabulated are the minimum and maximum figures for all nine types of brick.

Data applicable to insulating powders and granules are shown in Table III.

INSULATING CEMENTS

Test results presented in Table IV are on two cements made of diatomaceous silica, three of vermiculite and six of mineral or rock wool. These are the minimum and maximum results for each group.

The methods of tests by which the thermal and physical properties of all these brick, block, and cement materials are determined are described in the following:

Methods of Testing of Bricks and Blocks

DENSITY

The materials are oven-dried to constant weight at approximately 212 degrees Fahr. and then weighed to the nearest gram. The volumes are determined either by the sand displacement method or by actual measurements to the nearest 0.01-inch in the three directions, depending upon the type of material being tested, and the densities calculated from these data. The high, low average of samples are reported.

TRANSVERSE STRENGTH

The modulus of rupture is calculated from the breaking loads of the samples in accordance with the following formula:

$S = 3\,L\,W \div 2\,bd^2$

S = Modulus of rupture in pounds per square inch.
L = Length of span in inches.
W = Breaking load in pounds.
b = Width of sample in inches.
d = Depth of sample in inches at the point of break.

COLD CRUSHING OR COMPRESSIVE STRENGTH

Brick are tested on the 200,000-pound Riehle machine by crushing one-half of each brick used for modulus test. The load is applied at a machine head movement rate of 0.05-inch per minute.

$\frac{W}{b\,l}$ = Crushing strength in pounds per square inch

in which
W = Crushing load in pounds
l = Length of sample in inches
b = Width of sample in inches

Blocks are tested on the 60,000-pound Southwark-Emery machine

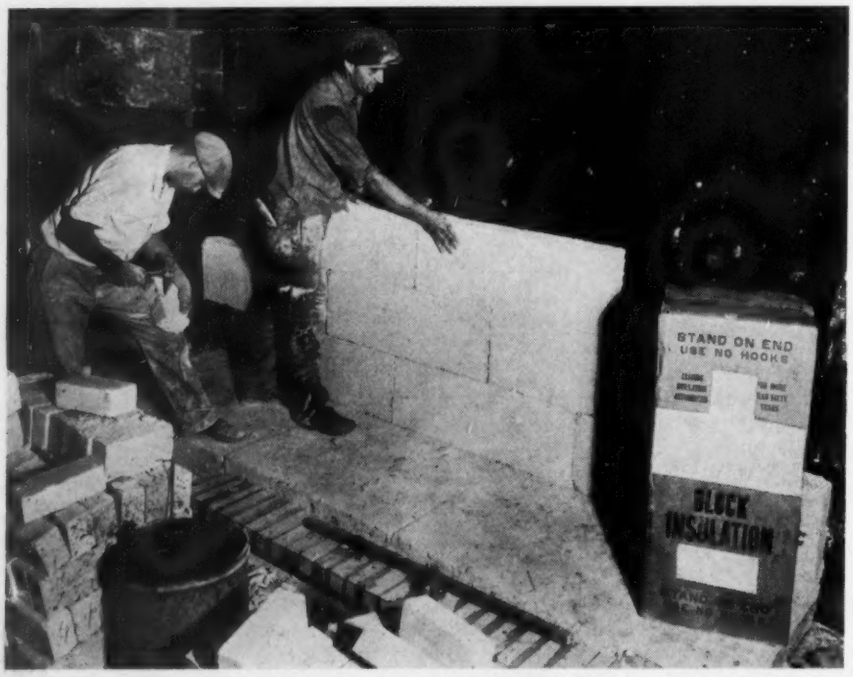


Fig. 14—Insulating the walls of a soaking pit in a large eastern steel plant

Yes Sir!
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For nearly 50 years they've been making Strip and they're always making it better. They know their product and they know the meaning of the word service on both Carbon and Stainless Strip . . . That's why I deal with Superior.
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SUPERIOR HOT AND COLD ROLLED STRIP

Table III

Test Results on Insulating Powders and Granules

Test Results on Insulating Powders and Granules

	Diatomaceous silica	Vermiculite	Mineral or rock wool
Density, lbs. per cu. ft.	17-31	7.5-8.5	9-12
Temperature limit, deg. Fahr.	1600-2000	1800	1000
Conductivity, mean temp. 1000 deg. Fahr.	0.69-1.36	1.67	1.10

by crushing 6 x 6-inch x nominal thickness blocks. The load is applied at a rate of 750 pounds per minute, and compression is read at load increments of 10 pounds per square inch, or total load increments of 360 pounds to failure.

ABRASIVE STRENGTH

Abrasive strength is measured in the U. S. bureau of standards rumbler, which is an oak box having inside dimensions of 7¼ x 7¾ x 7¾ inch. Twelve 1-inch weighed cubes of the specimen to be tested are placed in the box with twenty-four ¾-inch oak cubes and the box is rotated for ten minutes at 60 revolutions per minute. The specimen cubes then are removed and weighed and the loss in weight calculated. The specimen cubes are returned to the box and rotated for an additional ten minutes when the weights are again made and per cent loss calculated.

VOLUME SHRINKAGE

The volume shrinkage tests on blocks are made by measuring samples to nearest 0.01-inch. These samples are placed in the central portion of an electric furnace previously heated to the desired temperature. After 24 hours samples are removed, cooled, and again measured to the nearest 0.01-inch. Volume shrinkage in per cent then is calculated.

The volume shrinkage tests on bricks are made by measuring samples to nearest 0.01-inch. These samples are placed in the central portion of an oil-fired furnace, cold, and brought up to heat in not less than three hours. The test temperatures are held for a suitable number of hours. Furnace is allowed to cool to at least 500 degrees Fahr. after which samples are removed and measured as before. Volume shrinkage then is calculated in per cent.

LINEAR SHRINKAGE

Linear shrinkages are calculated from measurement taken on volume shrinkage test samples.

LINEAR THERMAL EXPANSION

The linear thermal expansion is determined on a ½ x ½ x 9-inch specimen cut from the center of a representative brick. This is placed in an electric furnace designed especially for the test and heated to the desired temperatures at a fixed rate.

LOAD TEST

The load test is made on one representative brick by placing it in a load furnace under a 12½ pounds per square inch load and raising the temperature according to the rate prescribed by the A. S. T. M. for medium duty firebrick.

PYROMETRIC CONE EQUIVALENT

The P. C. E. is determined on a composite sample taken from the center of the brick and pulverized until it will pass a 60 mesh sieve. This is made into cones which with the standard cones are heated in an Ajax induction furnace.

SPALLING

The spall test is made by placing the end of the sample brick in a furnace operating at a temperature of 2000 degrees Fahr., care being taken to heat only the 2½ x 4½-inch face. After 30 minutes of heating the sample is removed and stood on the cold end and allowed to cool at room temperature for 30 minutes. The brick then is replaced in the furnace and the cycle continued until 20 per cent by weight of the brick is lost due to spalling. The reported value is the number of air quenchings required for the brick to lose the required 20 per cent by weight. This is calculated from the breakage which occurs when the brick is lifted from the floor by grasping it by the end exposed to the heat.

TEMPERATURE LIMIT

The temperature limit is determined by observations of the linear shrinkage test, combined with observation of deterioration under sustained heat.

CONDUCTIVITY

The conductivity in B.t.u. per square foot per degree temperature difference between surfaces per 1-inch thick, per hour, expressed on the basis of the mean temperature between the hot and cold face is determined by one of three methods:

1. Bureau of standards guarded hot place apparatus as described in a paper on the "Thermal Conductivity of Heat Insulation" by M. S. Van Dusen, in the November 1920 issue of the A.S.R.E. journal.
2. Circular guarded hot plate apparatus as described in a paper on "Methods of Measuring the Thermal Conductivity of Insulating and Refractory Materials" by M. L. Hartmann, O. B. Westmont, and C. E. Weinland in Proceedings of A.S.T.M. volume 28, part II (1928).
3. Weinland high-temperature apparatus as described in a paper by C. E. Weinland entitled, "A Method of Measuring Thermal Conductivity at Furnace Temperatures" presented at the annual meeting of the American Ceramic society, Cincinnati, Feb. 15, 1934, and printed in the journal of the A. C. S., volume 17, No. 7, July 1934.

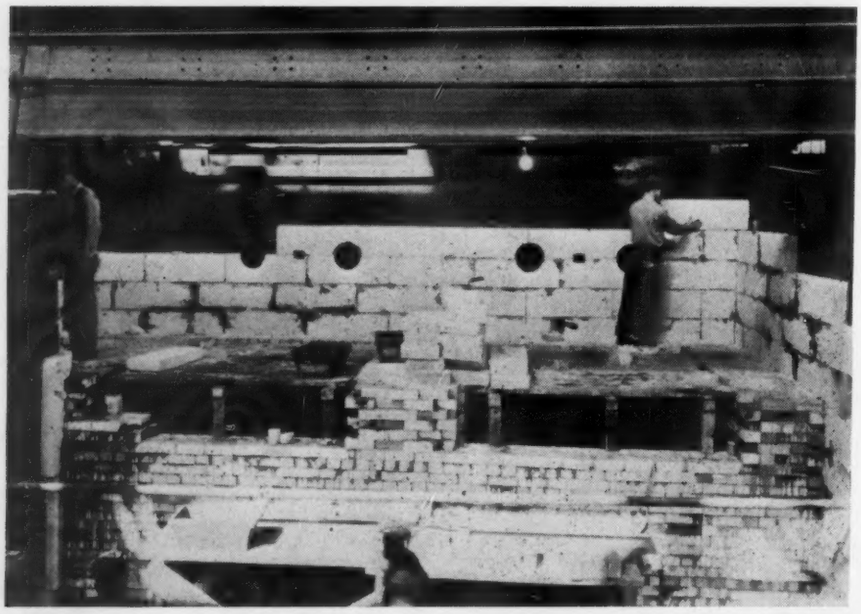


Fig. 13—Method of lining soaking pits with insulating block of diatomacceous silica

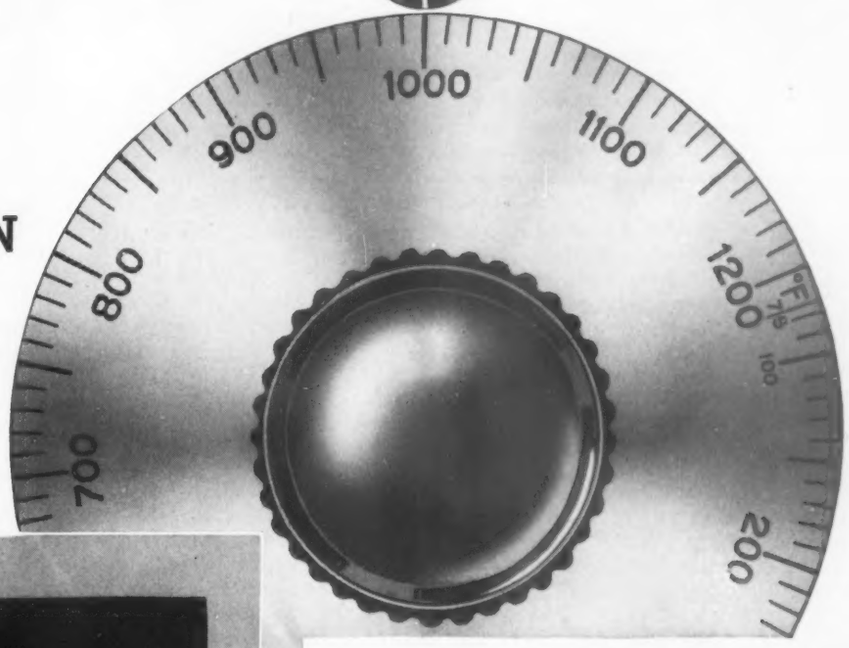
Methods of Testing Cements

DENSITY

Loose: The cement is sifted through the fingers from a height

ACCURATE SETTING..

FIRST STEP IN PRECISION CONTROL



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PYROMETER CONTROLLERS

RESPONSE · ACCURACY

Table IV

Test Results on Insulating Cements

	Diatomaceous silica	Vermiculite	Mineral or rock wool
Density, lbs. per cu. ft., loose	8-10	10-13	10-13
Covering capacity:			
In sq. ft. 1 inch thick per 100 lbs.—wet	50-55	73-92	47-60
In sq. ft. 1 inch thick per 100 lbs.—dry	42-45	68-80	40-50
Modulus of rupture, lbs./sq. in.	23-25	31-58	41-120
Adhesion, lbs. per sq. ft.	0-15	495-765	600-820
Temperature limit, deg. Fahr.	1900	1500	1200
Conductivity, mean temp. 1000 deg. Fahr.	0.8-0.9	1.11-1.29	1.0-1.15

of 1 foot into a tared cubic foot box (12 x 12 x 12 inches) until the box is heaping full. The cement is struck off level and weight determined.

Covering Capacity

Five pounds of cement is mixed with sufficient water to give the proper working consistency. The material then is trowelled onto a nonabsorbent platen and a smooth top surface is obtained. Measurements of the length, width, and thickness are made to the nearest 0.01-inch, depth measurements being made with a micrometer gage. The *wet* covering capacity then is calculated from these measurements, obtaining the number of square feet 1-inch thick per 100 pounds of dry cement. The material then is dried to a constant weight at 215 degrees Fahr. and the same measurements made again. From these dimensions, the *dry* covering is calculated, obtaining the number of square feet 1-inch thick per 100 pounds of dry cement.

Transverse Strength

The procedure is identical with that used for testing brick and block.

Adhesion

A 2 x 2-inch iron plate with a suitable hook attached is centered on a 6 x 6-inch area of another iron plate. Cement, properly mixed is applied to a depth of 2 inches over the two plates and allowed to dry thoroughly with heat not in excess of 215 degrees Fahr. applied only to the underside of the large iron plate. The larger plate then is inverted on knife edges and the cement pulled from the plate by means of a load applied on the hook attached to the 2-inch square plate. The adhesive load then is calculated in terms of pounds per square foot.

Volume Shrinkage

The volume shrinkage tests are made by measuring to the nearest 0.01-inch specially molded samples having the same density as "covering capacity" samples. These samples then are placed in the central portion of an electric furnace previously heated to the required temsamples are removed, cooled and perature. After 24 hours the again measured to the nearest 0.01-inch. Volume shrinkage in per cent then is calculated.

Linear Shrinkage Under Heat

The linear shrinkage results are the average results of blocks cut from the dried "covering capacity" sample of cement, raised and held at the required temperature for 24 hours. The shrinkage then is calculated on the basis of the original length.

Temperature Limit

The procedure is identical with that used for testing brick and block.

Conductivity

The procedure is identical with that used for testing brick and block.

(The second and concluding installment of this article will appear next week)

Table V

Data on Insulation for Blast Furnace, Hot Blast Stoves

BLOCK SPECIFICATION

	Conditions				Loss		Costs		
Zone	Area, sq. ft.	Av. temp., deg. Fahr.	Fire-brick inches	Insul. block inches	Million B.t.u. per year	Dollars per year	Materials	Labor	Applied
Combustion—lower half	514	1350	22½	6¼	464	71.00	$ 532	$ 51	$ 583
Combustion—upper half	700	2000	19½	6¼	1086	166.20	724	70	794
Dome	735	2150	18	4	1772	271.10	485	74	559
Checkers—upper half	2612	1350	9	6¼	2770	423.80	2702	261	2963
Checkers—lower half	2415	560	13½	1¾	2031	310.80	705	121	826
Total	6976				8123	$1242.90	$5148	$ 577	$5725

BRICK SPECIFICATION

Combustion—lower half	514	1350	22½	9	495	75.70	$ 493	$ 132	$ 625
Combustion—upper half	700	2000	19½	9	1190	182.10	672	179	851
Dome	735	2150	18	5	2100	321.20	397	106	503
Checkers—upper half	2612	1350	9	9	3000	459.00	2508	669	3177
Checkers—lower half	2415	560	13½	4½	1460	223.30	1159	309	1468
Total	6976				8245	$1261.30	$5229	$1395	$6624

Based on:

Hours operation per year	8760
Average air temperature, deg. Fahr.	50
Average wind velocity, miles per hour	3
Cost of block insulation, per board foot	$.165
Cost of brick insulation, per 1000	$75.00
Labor for applying block insulation, sq. ft. per layer	$0.05
Labor for applying brick insulation, per 1000	$20.00

Cost of Heat:

Lower heating value of blast furnace gas	90.0 B.t.u. per cu. ft.
Sensible heat in gases (330° Av.) above 60 deg. Fahr.	8.5 B.t.u. per cu. ft.
Heat available per cu. ft. of gas	81.5 B.t.u. per cu. ft.
Value of gas per 1000 cu. ft.	$.0125
Value of heat per 1,000,000 B.t.u. available	$.153

MATERIALS HANDLING

Develops Shock Absorbing Type of Roller Conveyor

(*Concluded from Page* 58)

coils are removed from the conveyor by the crane. The magnet is lowered on top of the coil and the coil is lifted. Sometimes, however, the conveyor is in a pit and it is difficult for the crane operator to see whether the magnet has been centered over the coil. When the coil has ben lifted several feet, the operator frequently discovers the magnet is not centered and he lowers the coil until both coil and magnet again rest on the conveyor. The magnet is centered and the coil lifted free of the conveyor and carried away. In one steel mill in which this condition existed, rollers of the solidly mounted type were badly bent by dropping coils upon them.

It is stated by the Mathews Conveyer Co. that heavy loads can be dropped upon shock-absorbing, resiliently-mounted conveyor and that the springs will absorb the shock. Many applications for the new type of equipment are enumerated, these including the handling of heavy shipping cases, castings, piles of sheet steel, coils of strip steel and wire, machinery, boxed export shipments, granite blocks, manufactured stone, timber, filled oil drums, molten metal in ladles, foundry sand in buckets, refrigerators, stoves, and numerous other products.

Bearing Maker Expands Research and Testing

(*Concluded from Page* 54)

pressure desired up to 1000 pounds and run in a sound-proof room for testing. It is capable of running at constant speeds or being accelerated or decelerated as desired.

Axle fatigue tests are made on the battery of machines shown in Fig. 2, these units being capable of handling axles up to 2 inches in diameter. With the application of tapered roller bearings to locomotive driving axles operating at high speeds, however, it was thought desirable to secure basic data on full size specimens. This required the design and construction of an entirely new piece of equipment, the only one in existence being shown in Fig. 4. Two axle shafts 8 feet long and up to 14 inches in diameter can be tested simultaneously in this machine, one being mounted at each end. A cantilever loading system is used, the load being applied by springs capable of exerting a pressure of 80,000 pounds. Standard Timken railroad axle boxes are used on the load end of the shaft, while the wheel end is mounted in a central shaft. This shaft also is equipped with Timken steel mill type bearings. The main shaft is driven through an eight-strand V-belt by a 100-horsepower, variable-speed motor, the main shaft being designed to run at a maximum speed of 1100 revolutions per minute.

One of the largest and most complete set-ups for photoelastic research and testing in this country has been installed by the company and much valuable data as to stresses and their distribution in various design members such as fillets, notches and other design shapes for which there is no analytical solution for the calculation of stresses already have been secured on this equipment. The installation is shown in Fig. 8. A typical fringe pattern showing the lower stress concentration in an axle due to the relief groove in the hub pressed on the axle is shown in Fig. 14.

Office, darkroom and drafting facilities, as well as sufficient machine tool equipment, of course, are provided in this new laboratory, which is operated on a 24-hour basis, most tests being continued to destruction. Chemical and metallurgical facilities are available in the Steel & Tube division laboratories of the company, and these are used to supplement and amplify the work done in the physical testing laboratory. Much of the machine work in preparing specimens is done in the bearing plant toolroom or experimental department, thus saving laboratory time and floor space.

Introduces New Impact Resistant Plastic Line

In order to meet varying requirements for impact strength, Bakelite Corp., New York, has developed a new line of molding materials which range in impact strength on an A.S.T.M. standard test specimen from 0.22 to 2.0 foot pounds energy to break.

These molding materials are classified as improved impact, medium impact, medium high impact and high impact. In each classification there are now two or more materials. This range of materials provides molded parts, in addition to impact resistance, with other properties such as water or chemical resistance, dielectric properties.

"HERCULES"
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WIRE ROPE

Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.

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SAN FRANCISCO
PORTLAND
SEATTLE

Design, Finish Add Sales Appeal to Modern Bicycle

(*Concluded from Page 76*)

partment which is some distance away in another part of the building.

Parts to be electoplated are first sent to the buffing room where they are polished prior to nickel plating. Usual buffing room practice is followed throughout except in the case of sprockets which are polished in semiautomatic machines designed especially for this purpose.

Sprockets occupy a conspicuous position on the bicycle and must be highly finished. The first abrasive operation is carried out in a double disc grinder fitted with two parallel wheels which rotate in opposite directions. These wheels are 20 inches in diameter, 1 inch face 1507-B grit, 7 DCM grade and are operated normally at a surface speed of 5000 feet per minute. The sprockets are held in a slide which is pushed between the wheels, thus grinding both sides simultaneously. Grinding in this manner finishes the work so that little subsequent polishing is necessary except to remove the grinding lines which are not radial with the work circumference. These lines are removed on a special polishing machine as shown in an accompanying illustration. The sprockets are nested in a holder and rotated at a speed of 40 revolutions per minute while they are fed past the face of a felt wheel 14 inches in diameter, 4¼-inch face set up with no. 180 emery. Oil is used in this operation. Wheel speed is approximately 7000 feet per minute.

After polishing all parts are cleand in a hot electrolytic cleaner, rinsed in cold water, acid dipped and rinsed again. Ths is followed by a heavy coat of nickel using a hot nickel process in a semiautomatic tank. This tank is maintained at a temperature of 120-130 degrees Fahr. Nickel plating is followed by nickel buff and a hot alkaline cleaner after which the parts are plated with chromium.

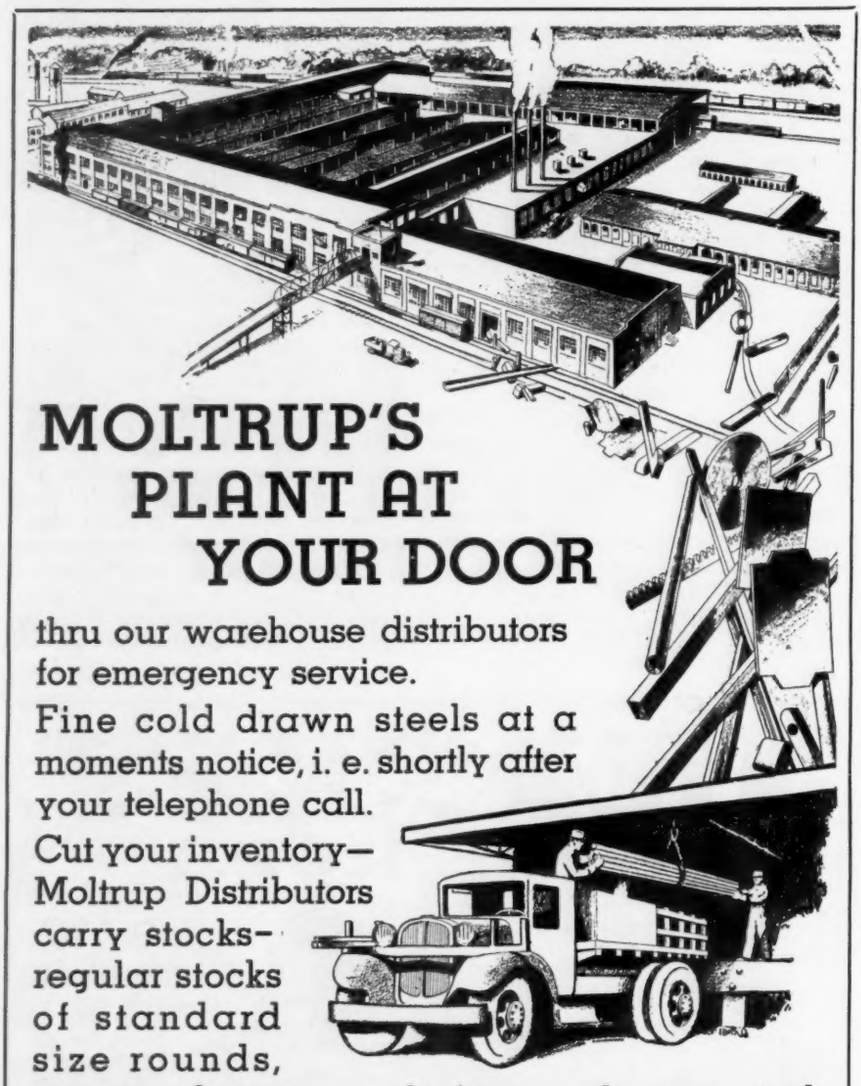
Plating procedures have been worked out accurately and close chemical control is maintained at all times. A plating rack department is maintained in conjunction with the plating department in which racks especially designed to give maximum efficiency on each job are built and serviced. This department is also responsible for the application and maintenance of the rubber and synthetic coatings used on the racks. It has been found that this department more than pays for itself in the saving of electric current, increased plating efficiency and increased rack life.

Wheel assembly is carried out in a separate department and, here, too, parts are assembled only upon order and conveyed to the assembly line as needed for production.

Line Assembly Methods Used

The final assembly and inspection department is located in a long room with two assembly lines. All parts except handle-bars and seats converge in this room and assembly is carried out on a line similar to that used in automobile production. Since each bicycle is built to order and specifications vary, a specification tag is attached to each frame to inform operators which accessories and parts are to be incorporated in each machine. Parts are conveniently arranged in racks so that production is smooth regardless of how many types of bicycles are on the production line.

At the end of the assembly line there is a final inspection group which checks each machine for mechanical defects and imperfections in finish. Defections are corrected on the spot after which the machine is waxed and sent on to the shipping department where each bicycle is packed in a separate wood crate with the seat and handle-bars secured in separate compartments. Peak capacity of the assembly department is from 1250 to 1500 bicycles per day.



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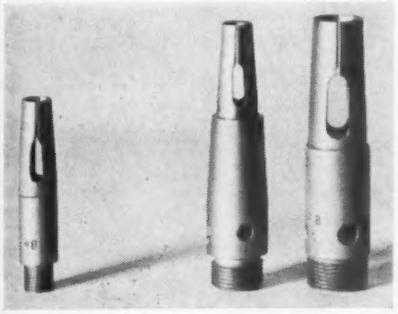
NEW EQUIPMENT

Feed Fingers—

Eastern Machine Screw Corp., New Haven, Conn., has developed a new line of feed fingers for feeding stock on automatic screw machines. These fingers, known as type K, have interesting features of design, enabling the same finger to be used on many different makes and sizes of machines. They are designed and proportioned for the size of stock to be used rather than

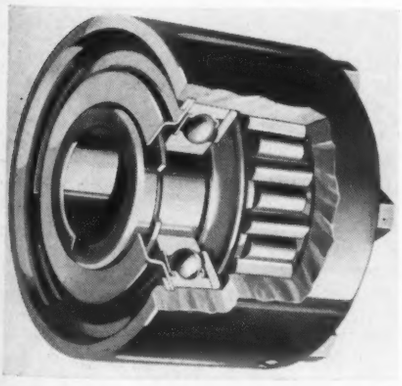


Eastern fingers designed for feeding stock on automatic screw machines

for the size of the machine. Adjusters are provided to fit the different sizes and makes of feed tubes and to give the proper overall length for each machine.

Clutch—

Morse Chain Co., Ithaca, N. Y., has announced a newly designed high-torque indexing and free-wheeling clutch. Multiple cams are used, spaced alternately with hardened ground steel rollers to distribute the load evenly on each cam. This feature permits high torque loads without danger to the cam surfaces and allows greater cam contact surface for a given clutch diameter. Cam action is governed by two leaf springs which contact shouldered surfaces milled at each end of the cams. The point of spring contact is such that a rocking action is created, with the fulcrum point at the center of the cams. Thus, when the speed of the inner and outer races synchronize, the cams immediately roll into a locking or driving position. The ball bearing at one end separates



Morse high torque indexing and free wheeling clutch

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● Horsburgh & Scott Worms are ground within an accuracy of .001" in lead, indexing and contour . . . a precision in manufacturing that insures higher efficiency, longer life and quieter operation. To obtain these exceedingly close limits, this company developed its own exclusive grinding machines. These machines plus precision inspection fixtures are your guarantee of the finest worms and gears possible.

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THE HORSBURGH & SCOTT CO.

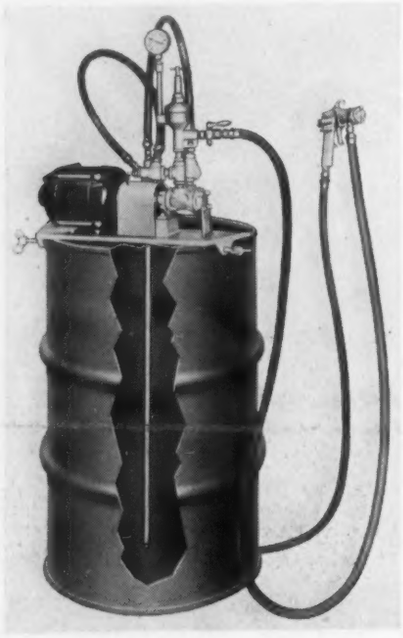
GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

the members and stabilizes the load. The opposite end of the unit is prepared for the attachment of sprocket wheel, ratchet arm, or belt pulley. Lubrication is self-contained.

Fluid Circulating Pump—

DeVilbiss Co., Toledo, O., has announced a new fluid circulating pump to be known as type QB, which offers a method of delivering non-pigmented finishing material from the shipping container direct to the spray gun. It is said to be the first equipment of its kind offered. Available in either electric or air-motor driven type, the units



New De Vilbiss fluid circulating pump for delivering any nonpigmented fluid to spray apparatus

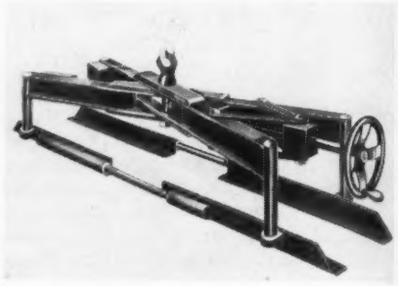
consist of a strong steel base plate on which is mounted the motor, pump, relief valve, and fluid regulator, and a fluid suction and return assembly which can easily be inserted and quickly interchanged in drums with ¾-inch or larger openings.

Speed Reducer—

Foote Bros. Gear & Machine Corp., 5301 South Western boulevard, Chicago, announces the addition of a new size to its line of Hygrade worm gear speed reducers. The new unit is size 7 HG and has center distance of 7¼ inches with ratios of 3⅞ to 1 up to 2450 to 1. Horsepower ratings range from ½ to 27½ horsepower in single reduction and output torque ratings of 12,600 to 21,000-inch pounds in double reduction types. Single reduction horizontal, single reduction vertical and double reduction types are available.

Sheet Metal Grab—

Richards-Wilcox Mfg. Co., Aurora, Ill., is now manufacturing a new sheet metal grab made of 2 and 3-ton capacity for handling sheets from 24 to 40 inches in width or wider and is adjusted by means of a wide thread screw and hand wheel. The action of the grab is similar to that of a scissors and the movement of the lower angles is always horizontal. This makes it possible to handle light gage material without danger of crimping the bottom sheets, it is claimed. Maximum head room required for the grab is 24 inches. A compensating movement which lengthens the lifting and supporting members of the grab makes it possible to handle any length without excessive sagging.



Richards-Wilcox sheet metal grab for handling sheets of 24 to 48 inches in width

RECENT PUBLICATIONS OF MANUFACTURERS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland

Furnace Atmospheres—C. M. Kemp Mfg. Co., Baltimore. Booklet summarizing and presenting data for solving furnace atmosphere problems.

Multiple Spindle Heads—Hoefer Mfg. Co., Freeport, Ill. Catalog E, illustrating and describing its numerous types of multiple spindle heads.

Smokeless Coal Firing—Appalachian Coals Inc., Transportation building, Cincinnati. Booklet describing the alternate method of coal firing.

Oil Burning Systems—Simplex Oil Heating Corp., 30 Church street, New York. Bulletin No. 110-37, describing its horizontal rotary type oil burning systems.

Furnace Atmospheres — Continental Industrial Engineers Inc., 201 North Wells street, Chicago. Booklet No. 111, dealing with the design and use of special atmospheres for industrial furnaces.

Stainless Steel — United States Steel Corp. Subsidiaries, Carnegie building, Pittsburgh. Catalog on stainless steel in architecture, with data, photographs and drawings specially prepared for architects and fabricators.

Pumps—Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago. Bulletin No. 6165, illustrating its duplex, self-oiling power pumps for handling mud and slush, clear water, petroleum products and other liquids; bulletin No. 1600, describing its polyphase wound-rotor or slip-ring ball-bearing induction motors with constant speed or adjustable varying speed.

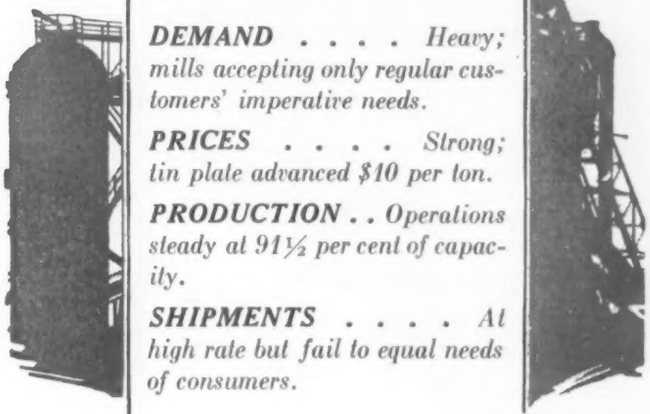
Impregnation with "dag" Colloidal Graphite—Acheson Colloids Corp., Port Huron, Mich. Bulletin A260, dealing with colloidal graphite impregnation from the theoretical standpoint. Bulletin B260, deals with the practical side.

Graphitic Steel—Timken Steel & Tube division, Timken Roller Bearing Co., Canton, O. Booklet announcing its graphitic steel, a series of steels containing included graphite with properties of hardness, machinability, resistance to failure by repeated impact, and wearing quality of special value to tool and die industry; bulletin No. 10, presents a series of data on oxidation at 1000, 1250 and 1500 degrees Fahr. on thirteen grades of steel.

Processing Equipment—A book of more than 100 pages, summarizing processing equipment installed by Mathews Conveyor Co., Ellwood City, Pa., during the past 18 months. It contains six sections: Introductory, coil-handling conveyors, sheet processing and a section dealing with roller conveyers and wheel conveyors, all designed primarily for equipping the steel industry for continuous production. It is intended for use of steel industrialists responsible for production.

Increasing Demand Overburdens Steelmakers

Tin Plate up $10; Scrap Advance Halts; Ingots Make Record



MARKET IN TABLOID

DEMAND . . . . *Heavy; mills accepting only regular customers' imperative needs.*

PRICES . . . . *Strong; tin plate advanced $10 per ton.*

PRODUCTION . . *Operations steady at 91½ per cent of capacity.*

SHIPMENTS . . . . *At high rate but fail to equal needs of consumers.*

ALTHOUGH the feeling of uncertainty apparent in the general business situation, resulting from governmental policies, has been reflected to some degree in the steel industry it has not had noticeable effect on buying or production.

Pressure for third quarter bookings has become so insistent that it is intimated some steelmakers may announce prices shortly for that delivery.

Despite best efforts of producers deliveries have not been bettered and with larger needs of automobile builders coming out as a result of settlement of strikes in the Detroit area the situation will be further complicated. March bookings of plates and shapes in the Pittsburgh district were heavier than the monthly average for 1929.

Every effort is being made by steelmakers to serve regular customers first and orders are booked only after careful scrutiny. Premiums offered for export tonnage are tempting but domestic business is given preference.

Steelmaking operations are unchanged at 91½ per cent of capacity. Pittsburgh is unchanged at 95, Chicago at 84, Eastern Pennsylvania at 59½, Wheeling at 96, Birmingham at 80, New England at 85, Detroit at 100 and St. Louis at 82 per cent. Buffalo loses one point to 88 per cent, Cleveland 5½ points to 74, Youngstown gains one point to 87 per cent and Cincinnati 10 points to 90 per cent.

Advance of 50 cents per hundredweight on tin plate, effective at once, reflects higher wages and material costs. The new price is $5.35, Pittsburgh. This applies to spot and export tonnage but contracts are not affected. Most users of large tonnages are covered on long-time contracts. Heavy export demand has been a factor in the increase. Special manufacturing terne plates were advanced 55 cents at the same time. This is the first advance since December, 1933.

Steel ingot production in March, 5,229,431 gross tons, was at 90.13 per cent of steelworks capacity and brought the first quarter to a new record, the highest first quarter of all time. In fact, it was only 748,213 tons less than the greatest quarterly output in steel history. The March tonnage has been exceeded only once, in May, 1929. The quarter's production was 54 per cent above that of the corresponding portion of 1936.

Structural steel awards rose sharply to 48,585 tons, the largest tonnage for any week this year except that of Jan. 30, when protections were being realized. Among the larger tonnages were 18,230 tons for an open-hearth building for Great Lakes Steel Corp., 4000 tons for a General Motors building at Baltimore, 4000 tons for the west side elevated highway in New York, 2525 tons for a building for Ford Motor Co. at Dearborn, Mich., 1800 tons for a bridge at Topeka, Kans., and several others above 1000 tons each.

Steel imports in February were 41,628 tons, compared with 43,063 tons in January, the shorter month accounting for more than the difference. Pig iron was the largest import item, 11,340 tons. Scrap imports, practically all from Canada, in January and February were almost equal, 2471 and 2421 tons.

Automobile production last week was 98,910 units, slightly larger than in the preceding week. General Motors produced 51,080 cars, compared with 51,280 the week before. Ford made 34,850.

Award of 8155 freight cars in March brought the total for first quarter to 30,933 cars, the largest total for a first quarter since 1929 when 43,163 were placed. The quarterly total exceeds the number bought in any entire year since 1930.

A pause in the rapid upward movement of steelmaking scrap prices at Pittsburgh has given that market an easier feeling, though the setback is not severe and in some centers advances continue on certain grades. Export prices have not been affected. The composite price of steelmaking scrap has declined 48 cents, to $21.60, the first downward movement since mid-January. This composite is the same as that at the end of March. Sale of heavy melting steel by the New York Central for Youngstown, O., delivery at $23.50 indicates the market is strong under the surface. Higher price of tin plate has raised the finished steel composite $1 to $61.70 and the iron and steel composite 36 cents to $40.55.

COMPOSITE MARKET AVERAGES

	Apr. 10	Apr. 3	Mar. 27	One Month Ago Mar., 1937	Three Months Ago Jan., 1937	One Year Ago Apr., 1936	Five Years Ago Apr., 1932
Iron and Steel	$40.55	$40.19	$40.11	$39.92	$36.55	$33.10	$29.44
Finished Steel	61.70	60.70	60.70	60.70	55.80	52.20	47.62
Steelworks Scrap ..	21.60	22.08	21.60	20.95	18.12	14.39	7.76

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	April 10, 1937	Mar. 1937	Jan. 1937	Apr. 1936
Steel bars, Pittsburgh	2.45c	2.40c	2.20c	1.85c
Steel bars, Chicago	2.50	2.45	2.25	1.90
Steel bars, Philadelphia	2.74	2.74	2.49	2.16
Iron bars, Terre Haute, Ind.	2.35	2.25	2.10	1.75
Shapes, Pittsburgh	2.25	2.20	2.05	1.80
Shapes, Philadelphia	2.45½	2.45½	2.25½	2.01½
Shapes, Chicago	2.30	2.25	2.10	1.85
Tank plates, Pittsburgh	2.25	2.20	2.05	1.80
Tank plates, Philadelphia	2.43½	2.43½	2.23½	1.99
Tank plates, Chicago	2.30	2.30	2.10	1.85
Sheets, No. 10, hot rolled, Pitts.	2.40	2.35	2.15	1.85
Sheets, No. 24, hot ann., Pitts.	3.15	3.10	2.80	2.40
Sheets, No. 24, galv., Pitts.	3.80	3.70	3.40	3.10
Sheets, No. 10, hot rolled, Gary	2.50	2.45	2.25	1.95
Sheets, No. 24, hot anneal., Gary	3.25	3.20	2.90	2.50
Sheets, No. 24, galvan., Gary	3.90	3.85	3.50	3.20
Plain wire, Pittsburgh	2.90	2.85	2.60	2.40
Tin plate, per base box, Pitts.	$5.35	4.85	4.85	5.25
Wire nails, Pittsburgh	2.75	2.70	2.25	2.10

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$36.40	$34.00	$28.00
Sheet bars, open-hearth, Pitts.	37.00	36.40	34.00	28.00
Billets, open-hearth, Pittsburgh	37.00	36.40	34.00	28.00
Wire rods, No. 5 to ⅜-inch, Pitts.	47.00	46.20	43.00	40.00

Pig Iron

	April 10, 1937	Mar. 1937	Jan. 1937	Apr. 1936
Bessemer, del. Pittsburgh	$25.26	$24.85	$22.31	$20.81
Basic, Valley	23.50	23.10	20:50	19.00
Basic, eastern del. East Pa.	25.26	24.76	22.26	20.81
No. 2 fdy., del. Pittsburgh	25.21	24.80	22.21	20.31
No. 2 fdy., Chicago	24.00	23.20	21.00	19.50
Southern No. 2, Birmingham	20.38	19.88	17.38	15.50
Southern No. 2, del. Cincinnati	23.69	23.19	20.69	20.2007
No. 2X eastern, del. Phila.	26.135	25.63½	23.13½	21.68
Malleable, Valley	24.00	23.60	21.00	19.50
Malleable, Chicago	24.00	23.20	21.00	19.50
Lake Sup., charcoal, del. Chicago	30.04	28.95	26.54	25.2528
Gray forge, del. Pittsburgh	24.17	23.75	21.17	19.67
Ferromanganese, del. Pittsburgh	99.79	90.80	84.79	80.13

Scrap

Heavy melting steel, Pittsburgh	$22.75	$22.40	$18.95	$15.75
Heavy melt. steel, No. 2, East Pa.	19.75	18.75	16.40	12.56
Heavy melting steel, Chicago	21.25	20.90	18.25	14.35
Rail for rolling, Chicago	23.75	22.25	19.40	15.75
Railroad steel specialties, Chicago	24.25	22.35	19.65	15.85

Coke

Connellsville, furnace, ovens	$4.25	$4.05	$4.00	$3.50
Connellsville, foundry, ovens	4.80	4.25	4.25	4.25
Chicago, by-product foundry, del.	11.00	10.25	10.25	9.75

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Prices Subject to Quantity Extras and Deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pacific ports, f.o.b. dock	2.95c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, del.	3.48c
Philadelphia, del.	3.44c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pacific ports, f.o.b. dock	3.80c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.09c
New York, delivered	4.13c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pacific ports, f.o.b. dock	4.40c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.10c
Gary	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.39c
New York, del.	3.43c
St. Louis, del.	3.33c
Granite City, Ill.	3.30c
Pacific ports, f.o.b. dock	3.70c

Cold Rolled No. 20

Pittsburgh	3.55c
Gary	3.65c
Detroit, delivered	3.75c
Philadelphia, Pa.	3.84c
New York, del.	3.88c
St. Louis	3.78c
Granite City, Ill.	3.75c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke, (base box), Pittsburgh	$5.35
Waste-waste, 2.75c; strip,	2.50c
Long ternes, No. 24 unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.53c
Philadelphia, del.	2.43½c
Boston, delivered	2.65c
Buffalo, delivered	2.50c
Chicago or Gary	2.30c
Cleveland, del.	2.44½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, delivered	2.52c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.45½c
New York, del.	2.50¼c
Boston, delivered	2.63½c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.45c
Buffalo	2.35c
Gulf Ports	2.65c
Birmingham	2.40c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, del.	2.52c

Bars

Soft Steel
(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific ports, f.o.b. cars, dock	3.00c
Philadelphia, del.	2.74c
Boston, delivered	2.85c
New York, del.	2.78c
Pitts., forg. qual.	2.80c

Rail Steel
To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Moline, Ill.	2.35c
Cleveland	2.35c
Buffalo	2.40c

Iron

Terre Haute, Ind. 2.35c
Chicago 2.40c
Philadelphia 2.64c
Pittsburgh, refined....3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors
Pittsburgh 2.55c
Chicago, Gary, Buffalo Cleve., Birm., Young... 2.60c
Gulf ports 2.65c
Pacific coast ports f.o.b. car docks 2.95c
Philadelphia, del. 2.84c
Rail steel, straight lengths, quoted by distributors
Pittsburgh 2.40c
Chicago, Buffalo, Cleveland, Birm., Young..... 2.45c
Gulf ports 2.80c

Wire Products

Prices apply to straight or mixed carloads; less carloads $5 higher; less carloads fencing $5 over base column.

Base Pitts.-Cleve. 100 lb. keg.
Standard wire nails..... $2.75
Cement coated nails $2.75
(Per pound)
Polished staples 3.45c
Galv. fence staples 3.70c
Barbed wire, galv. 3.40c
Annealed fence wire..... 3.20c
Galv. fence wire 3.60c
Woven wire fencing (base column, c. l.)....$74.00
Single loop bale ties, (base column, c. l.).... 63.00

To Manufacturing Trade

Plain wire, 6-9 ga..... 2.90c
Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.
Spring wire, Pitts. or Cleveland 3.50c
Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars and Shafting

Pittsburgh 2.90c
Chicago 2.95c
Gary, Ind. 2.95c
Detroit 2.95c
Cleveland 2.95c
Buffalo 3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 3.00c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 150-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring 0.15
6100 bars 1.20
6100 spring 0.85
Cr. Ni., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40

Piling

Pittsburgh 2.60c
Chicago, Buffalo 2.70

Strip and Hoops

(Base, hot rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)
Hot strip to 23¾-in.
Pittsburgh 2.40c
Chicago or Gary 2.50c
Birmingham base 2.55c
Detroit, del. 2.60c
Philadelphia, del. 2.69c
New York, del. 2.73c
Cooperage hoop,
Pittsburgh 2.50c
Chicago 2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland 3.20c
Detroit, del. 3.40c
Worcester, Mass. 3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50...	3.20c	3.40c
0.51—0.75...	4.45c	4.65c
0.76—1.00...	6.30c	6.50c
Over 1.00...	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill.....$42.50
Relay rails, Pittsburgh, 20—100 lbs. 32.50-35.50
Light rails, billet qual..
Pittsburgh, Chicago....$43.00
Do., rerolling quality.. 42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago 2.80c
Do., axle steel 3.35c
Spikes, R. R. base 3.15c
Track bolts, base..... 4.35c
Tie plates, base.....$46.00
Base, light rails 25 to 40 lbs.; 50 to 60 lbs., inclusive up $2; 16 and 20 lbs. up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller ....65-5 off
Do. larger .....60-10 off
Tire bolts .....50 off

Plow Bolts

All sizes .....65-5 off

Stove Bolts

In packages with nuts attached 72½ off; in packages with nuts separate 72½-5 off; in bulk 81½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.
Step bolts .....60 off
Elevator bolts .....50-10-5 off

Nuts

S. A. E. semifinished hex.:
½ to ⅞-inch .....60-20 off
Do., ½ to 1-inch....60-15 off
Do., over 1-inch...60-12½ off

Hexagon Cap Screws

Milled .....50-10 off
Upset, 1-in., smaller ....60 off

Square Head Set Screws

Upset, 1-in., smaller .....75 off
Headless set screws .....75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland 3.60c
Structural, Chicago..... 3.70c
⅞-inch and smaller Pitts., Chi., Cleve. .....70 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. .....$5.75 off

Cut Nails

Cut nails, Pitts. (10% discount on all extras).. $3.60
Do., less carloads, 5 kegs or more, no discount on any extras... $3.90
Do., under 5 kegs, no disc. on size extras... $4.05

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld
Steel

In.	Blk.	Galv.
¼ and ⅜	55	38½
½	59½	49
¾	62½	53
1—3	64½	55½
Iron		
½	20	1½
¾	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld
Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50
Iron		
2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9-12	24½	10

Line Pipe
Steel

⅛, butt weld	51
¼ and ⅜, butt weld	54
½, butt weld	58½
¾, butt weld	61½
1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Iron

Butt	Black	Galv.
½	19	½
¾	25	7
1 and 1¼	29	13
1½	33	15½
2	32½	15
Lap		
1¼	18	½
1½	23½	17
2	25½	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Seamless Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet, subject to usual extras for quantity, length, etc.

	Hot Rolled	Cold Drawn
1" OD x 13 Ga...	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2" OD x 13 Ga...	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2½" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.85	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga...	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga...	32.83	36.96
5" OD x 9 Ga....	50.38	56.71
6" OD x 7 Ga....	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm...$46.00-47.00
4-in., Birmingham.. 49.00-50.00
4-in., Chicago 57.00-58.00
6 to 24-in., Chicago. 54.00-55.00
6-in. & over, east fdy. 50.00
Do., 4-in. 53.00
Class A pipe $3 over Class B
Stnd. fitgs., Birm. base..$100.00

Semifinished Steel

Billets and Blooms
4 x 4-*inch base; gross ton*
Pitts., Chi., Cleve., Buffalo and Young. $37.00
Philadelphia 42.30
Duluth 39.00

Forging Billets
6 x 6 *to* 9 x 9-*in., base*
Pitts., Chicago, Buffalo.. 43.00
Forging, Duluth 45.00

Sheet Bars
Pitts., Cleve., Young., Sparrows Point 37.00

Slabs
Pitts., Chicago, Cleveland, Youngstown 37.00

Wire Rods
Pitts., Cleve., No. 5 to ⅝-inch incl. 47.00
Do., over ⅝ to ⅷ-inch incl. 52.00
Chicago up $1; Worcester up $2

Skelp
Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt. 2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur... $4.25
Connellsville, fdry.. 4.75- 5.00
Connell. prem. fdry. 5.50- 5.85
New River fdry. .. 6.50
Wise county fdry... 5.75- 6.00
Wise county fur.... 4.75- 5.00

By-Product Foundry

Newark, N. J., del... 10.85-11.30
Chi., ov., outside del. 10.25
Chicago, del. 11.00
Milwaukee, ovens.. 11.00
New England, del.. 12.50
St. Louis, del. 10.50-11.00
Birmingham, ovens 6.50
Indianapolis, del... 10.50
Cincinnati, del. 10.50
Cleveland, del. 11.00
Buffalo, del. 10.50
Detroit, del. 10.70
Philadelphia, del. .. 10.60

Coke By-Products

Spot. gal. Producers' Plants
Pure and 90% benzol... 16.00c
Toluol 30.00c
Solvent naphtha 30.00c
Industrial xylol 30.00c
Per lb. f.o.b. Frankford
Phenol (200 lb. drums).. 15.00c
Do., (450 lbs.) 14.00c
Eastern Plants, per lb.
Naphthalene flakes and balls, in bbls., to jobbers 7.25c
Per 100-lbs. Atlantic seaboard
Sulphate of ammonia.... $1.35
†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$23.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	24.50
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Hamilton, O.	24.00	24.00	23.50	.....
Jackson, O.	24.00	24.00	.....	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrows Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	25.26	25.26	24.76	25.76
Baltimore from Birmingham	25.58	.....	24.46	.....
Boston from Birmingham	26.37	.....	25.87	.....
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.27	27.77	.....	.....
Brooklyn, N. Y., from Bmghm.	27.05	.....	.....	.....
Canton, O., from Cleveland	25.26	25.26	25.76	25.76
Chicago from Birmingham	24.22	.....	24.10	.....
Cincinnati from Hamilton, O.	24.07	25.01	24.51	.....
Cincinnati from Birmingham	23.69	.....	22.69	.....
Cleveland from Birmingham	24.12	.....	23.62	.....
Mansfield, O., from Toledo, O.	25.76	25.76	25.26	25.26
Milwaukee from Chicago	25.00	25.00	24.50	25.00
Muskegon, Mich., from Chicago, Toledo or Detroit	26.90	26.90	26.40	27.40
Newark, N. J., from Birmingham	26.01	.....	.....	.....
Newark, N. J., from Bethlehem	26.39	26.89	.....	.....
Philadelphia from Birmingham	25.38	.....	25.26	.....
Philadelphia from Swedeland, Pa.	25.76	26.26	25.26	.....
Pittsburgh district from Neville Island	∫ Neville, base plus 63c, 76c, ⌇ and $1.13 switch'g charges			
Saginaw, Mich., from Detroit	26.25	26.25	25.75	25.75
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	25.94	25.94	.....	26.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phila. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.04
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80

Ohio

First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	43.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	25.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$19.00
Do., for barge	$20.00

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Apr. 3	17.00	17.12½	16.75	62.62½	61.87½	6.90	6.75	7.50	*20.00	17.00	35.00
Apr. 5	17.00	17.12½	16.75	62.87½	62.12½	6.90	6.75	7.50	*20.00	17.00	35.00
Apr. 6	16.00	16.12½	15.75	61.62½	61.12½	6.90	6.75	7.50	*20.00	17.00	35.00
Apr. 7	16.00	16.12½	15.75	59.87½	59.25	6.00	5.85	7.50	*20.00	17.00	35.00
Apr. 8	15.50	16.12½	15.25	60.37½	57.50	6.00	5.85	7.00	*20.00	17.00	35.00
Apr. 9	15.00	16.12½	15.25	60.62½	60.00	6.00	5.85	7.00	*20.00	17.00	35.00

*Nominal range 20.00 to 21.00.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 16.00c Conn. copper

Sheets

*Yellow brass (high)	21.12½
*Copper, hot rolled	23.62½
*Lead, cut to jobbers	9.50
Zinc, 100-lb. base	12.50-13.00

Tubes

*High yellow brass	23.87½
*Seamless copper	24.37½

Rods

*High yellow brass	17.50
*Copper, hot rolled	20.37½

Anodes

*Copper, untrimmed	20.87½

Wire

*Yellow brass (high)	21.37½

OLD METALS

Nominal deal. buying prices

No. 1 Composition Red Brass

*New York	10.75
*Cleveland	10.25-10.37½
*Chicago	10.00-10.25
St. Louis	11.75-12.00

Heavy Copper and Wire

*New York, No. 1	13.00
*Cleveland, No. 1	12.00-12.25
*Chicago, No. 1	12.00-12.25
*St. Louis, No. 1	13.00

Composition Brass Borings

*New York	9.75

Light Copper

*New York	11.00
*Cleveland	10.00-10.25
*Chicago	10.00-10.25
*St. Louis	11.25-11.75

Light Brass

*Chicago	6.75- 7.00
*Cleveland	6.50- 6.75
St. Louis	7.25- 7.75

Lead

*New York	4.75- 5.00
Cleveland	4.75- 5.00
Chicago	5.00-5.12½
*St. Louis	5.12½- 5.25

Zinc

*New York	3.75- 4.00
Cleveland	3.75- 4.00
*St. Louis	4.00- 4.50

Aluminum

Borings, Cleveland	10.75-11.00
Mixed, cast, Cleve.	14.00-14.25
Clips, soft, Cleve.	15.50-15.75
Mixed, cast, St. L.	13.50-14.00

SECONDARY METALS

*Brass, ingot 85-5-5-5, lcl.	15.50
Stand. No. 12 alum.	18.75-19.25

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty paid	$95.00
Do., Baltimore, base	95.00
Do., del. Pittsburgh	99.79
Spiegeleisen, 19-20% dom. Palmerston, Pa., spot	30.00
Do., New Orleans	30.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	89.00
2% carbon, 94.00; 1%,	104.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	1.70
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton	142.50
Spot, carlots	145.00
Spot, ton lots	150.00
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads. Quan. diff. apply	

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore	3.85c
Boston ††	4.05c
Buffalo	3.10c
Chattanooga	3.96c
Chicago (j)	3.85c
Cincinnati	3.55c
Cleveland	3.75c
Detroit	3.93½c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.96c-4.11c
New Orleans	4.20c
New York‡ (d)	4.12c
Pitts. (h)	3.80c
Philadelphia	4.00c
Portland	4.45c
San Francisco	4.20c
Seattle	4.45c
St. Louis	4.09c
St. Paul	4.10c-4.25c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.96c
Baltimore*	3.10c
Cincinnati	3.55c
New York‡ (d)	3.65c
Philadelphia	4.00c
St. Louis	4.09c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.96c
Cleveland (c)	2.55c
Cincinnati	3.40c
Houston	3.25c
Los Angeles, c.l.	2.45c
New Orleans*	3.14c
Pitts., plain (h)	2.55c
Pitts., twisted squares (h)	3.95c
San Francisco	2.97½c
Seattle	4.02½c
St. Louis	3.99c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.85c
Boston ††	3.92c
Buffalo	3.35c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.65c
Cleveland	3.86c
Detroit	3.95c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	3.97c
Philadelphia	3.90c
Pittsburgh (h)	3.70c
Portland (i)	4.45c
San Francisco	4.05c
Seattle (i)	4.45c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

PLATES

Baltimore	3.80c
Boston ††	3.93c
Buffalo	3.47c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.65c
Cleveland, ¼-in. and over	3.86c
Detroit	3.95c
Detroit, ⅜-in.	4.15c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	4.00c
Philadelphia	3.90c
Phila. floor	4.95c
Pittsburgh (h)	3.70c
Portland	4.25c
San Francisco	4.05c
Seattle	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

NO. 10 BLUE

Baltimore	3.80c
Boston (g)	4.00c
Buffalo	3.72c
Chattanooga	3.91c
Chicago	3.85c
Cincinnati	3.50c
Cleveland	3.91c
Det. 8-10 ga.	3.93½c
Houston	3.45c
Los Angeles	4.50c
Milwaukee	3.96c
New Orleans	4.10c
New York‡ (d)	4.07c
Portland	4.50c
Philadelphia	4.00c
Pittsburgh (h)	3.75c
San Francisco	4.30c
Seattle	4.50c
St. Louis	4.39c
St. Paul	4.10c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	4.50c
Boston (g)	4.75c
Buffalo	3.35c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.05c
Cleveland	4.66c
Detroit	4.68½c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York‡ (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	5.35c
Seattle	5.35c
San Francisco	5.15c
St. Louis	4.84c
St. Paul	4.75c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	4.70c
Buffalo	4.10c
Boston (g)	5.30c
Chattanooga*	4.76c
Chicago (h)	5.10c-5.75c
Cincinnati	4.65c
Cleveland	5.31c
Detroit	5.40c
Houston	4.50c
Los Angeles	5.55c
Milwaukee	5.21c-5.86c
New Orleans*	4.49c
New York‡ (d)	5.47c
Philadelphia	5.30c
Pitts.** (h)	5.40c
Portland	5.90c
San Francisco	5.85c
Seattle	5.90c
St. Louis	5.49c
St. Paul	5.40c
Tulsa	5.20c

BANDS

Baltimore	3.85c
Boston ††	4.25c
Buffalo	3.52c
Chattanooga	4.16c
Cincinnati	3.75c
Cleveland	4.16c
Chicago	4.10c
Detroit, ⅛-in. and lighter	4.185c
Houston	3.35c
Los Angeles	4.50c
Milwaukee	4.21c
New Orleans	4.75c
New York‡ (d)	4.32c
Philadelphia	4.10c
Pittsburgh (h)	3.70c
Portland	4.95c
San Francisco	4.50c
Seattle	4.95c
St. Louis	4.34c
St. Paul	4.35c
Tulsa	3.55c

HOOPS

Baltimore	4.10c
Boston ††	5.25c
Buffalo	3.52c
Chicago	4.10c
Cincinnati	3.75c
Detroit, No. 14 and lighter	4.185c
Los Angeles	6.55c
Milwaukee	4.21c
New York‡ (d)	4.32c
Philadelphia	4.35c
Pittsburgh (h)	4.50c
Portland	6.30c
San Francisco	6.50c
Seattle	6.30c
St. Louis	4.34c
St. Paul	4.35c

COLD FIN. STEEL

Baltimore (c)	4.50c
Boston*	4.65c
Buffalo (h)	3.70c
Chattanooga*	4.86c
Chicago (h)	4.30c
Cincinnati	4.15c
Cleveland (h)	4.30c
Detroit	4.30c
Los Ang. (f) (d)	6.85c
Milwaukee	4.41c
New Orleans	5.10c
New York‡ (d)	4.57c
Philadelphia	4.53c
Pittsburgh	4.15c
Portland (f) (d)	5.85c
San Fran. (f) (d)	6.80c
Seattle (f) (d)	5.85c
St. Louis	4.54c
St. Paul	4.77c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.845c
Buffalo	3.39c
Chicago	3.87c
Cincinnati	3.00c
Cleveland (b)	3.60c
Detroit	3.43c
New York‡ (d)	3.92c
St. Louis	4.54c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)

	Base
High speed	69c
High carbon, Cr	45c
Oil hardening	26c
Special tool	24c
Extra tool	20c
Regular tool	16c
Water hardening	12½c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	55 to 60
Cleveland	60-5-5
Detroit	70-10
Milwaukee	55 to 60
New Orleans	65
Pittsburgh	65-5

(a) Under 100 lbs. 50 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 0.15c higher.

On plates, shapes bars, hot strip and blue annealed quantity extras and discounts as follows: Under 100 lbs. add $1.50; 100 to 399 lbs., add 50c; 400 to 3999 lbs., base; 4000 to 9999 lbs., deduct 10c; over 10,000 lbs., deduct 15c. At Cleveland, under 400 lbs., add 50c, with $1 minimum invoice.

‡Domestic steel; *Plus quantity extras. **One to 9 bundles; *†50 or more bundles, †New extras apply; ††Base 10,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, April 8

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$24.50 5 0 0	28.06	3 9 0
Basic bessemer	19.23 3 18 6*	14.23	1 15 0
Hematite, Phos. .03-.05	21.44 4 7 6	.....	.....
SEMIFINISHED STEEL			
Billets	$30.62 6 5 0	$27.24	3 7 0
Wire rods, No. 5 gage	47.16 9 12 6	48.80	6 0 0
FINISHED STEEL			
Standard rails	$42.88 8 15 0	$48.80	6 0 0
Merchant bars	2.08c 9 10 0	1.85c	5 0 0
Structural shapes	2.00c 9 2 6	1.80c	4 17 6
Plates, ††¼ in. or 5 mm.	2.23c 10 3 9	2.27c	6 2 6
Sheets, black, 24 gage or 0.5 mm	2.85c 13 0 0	2.87c	7 15 0††
Sheets, gal., 24 gage, corr.	3.67c 16 15 0	3.61c	9 15 0
Bands and strips	2.19c 10 0 0	2.22c	6 0 0
Plain wire, base	2.41c 11 0 0	2.77c	7 10 0
Galvanized wire, base	2.74c 12 10 0	2.96c	8 0 0
Wire nails, base	2.63c 12 0 0	3.14c	8 10 0
Tin plate, box 108 lbs.	$ 6.00 1 4 6	.....	.....

British ferromanganese $95 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reichsmarks
Fdy. pig iron, Si. 2.5	$19.84	4 1 0(a)	$18.24	400	$26.96	800	$25 34	63
Basic bessemer pig iron	20.21	4 2 6(a)	12.54	275	14.66	435	27.96 (b)	69.50
Furnace coke	6.61	1 7 0	6.25	137	5.73	170	7.64	19
Billets	30.62	6 5 0	26.90	590	25.61	760	38.82	96.50
Standard rails	1.81c	8 5 0	1.64c	780	1.80c	1,200	2.40c	132
Merchant bars	2.08c	9 10 0	1.68c	800	1.46c	975	2.00c	110
Structural shapes	2.00c	9 3 0	1.64c	780	1.46c	975	1.95c	107
Plates, †¼-in. or 5 mm.	2.15c	9 16 9	2.12c	1,010	1.97c	1,245	2.31c	127
Sheets, black	3.07c	14 0 0§	2.84c	1,350‡	2.19c	1,460‡	2.62c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.72c	17 0 0	4.41c	2,100	2.85c	1,900	6.73c	370
Plain wire	2.57c	11 15 0	2.73c	1,360	2.48c	1,650	3.15c	173
Bands and strips	2.24c	10 5 0	1.92c	915	1.88c	1,250	2.31c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 67 per cent over paper sterling.

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham†	14.50-15.00
Bos. dock, No. 1, exp.	17.50-18.00
N. Eng. del. No. 1	17.50
Buffalo, No. 1	20.00-21.00
Buffalo, No. 2	19.00-19.50
Chicago, No. 1	21.00-21.50
Cleveland, No. 1	21.00-21.50
Cleveland, No. 2	19.50-20.00
Detroit, No. 1	18.25-18.75
Eastern Pa., No. 1	21.00
Eastern Pa., No. 2	19.50-20.00
Federal, Ill.	16.25-16.75
Granite City, R. R.	18.25-18.75
Granite City, No. 2	16.25-16.75
New York, No. 1	17.00-17.50
N. Y. dock, No. 1 exp.	17.50-18.00
Pitts., No. 1 (R. R.)	23.50-24.00
Pitts., No. 1 (dlr.)	22.50-23.00
Pittsburgh, No. 2	19.00-19.50
St. Louis, R. R.	18.50-19.00
St. Louis, No. 2	16.50-17.00
Toronto, dlrs. No. 1	11.00-12.00
Toronto, No. 2	10.00-11.00
Valleys, No. 1	23.00-23.50

COMPRESSED SHEETS

Buffalo, dealers	19.00-19.50
Chicago, factory	20.50-21.00
Chicago, dealer	19.50-20.00
Cleveland	20.50-21.00
Detroit	19.50-20.00
E. Pa., new mat.	21.00
E. Pa., old mat.	17.50
Pittsburgh	22.50-23.00
St. Louis	16.00-16.50
Valleys	22.00-22.50

BUNDLED SHEETS

Buffalo	16.00-16.50
Cincinnati, del.	14.50-15.00
Cleveland	16.50-17.00
Pittsburgh	21.00-21.50
St. Louis	13.50-14.00
Toronto, dealers	8.00

SHEET CLIPPINGS, LOOSE

Chicago	14.00-14.50
Cincinnati	13.50-14.00
Detroit	14.00-14.50
St. Louis	13.50-14.00

STEEL RAILS, SHORT

Birmingham	17.00-18.00
Buffalo	24.50-25.50
Chicago (3 ft.)	23.50-24.00
Chicago (2 ft.)	25.00-25.50
Cincinnati, del.	24.00-24.50
Detroit	24.00-24.50
Pitts., 3 ft. and less	26.00-26.50
St. Louis, 2 ft. & less	20.00-20.50

STEEL RAILS, SCRAP

Boston, district	†17.25-17.50
Buffalo	21.00-22.00
Chicago	22.00-22.50
Cleveland	22.00-22.50
Pittsburgh	24.00-24.50
St. Louis	20.00-20.50

STOVE PLATE

Birmingham	10.50-11.00
Boston district	†11.50-11.75
Buffalo	15.00-16.00
Chicago	12.00-12.50
Cincinnati, dealers	12.00-12.50
Detroit, net	12.00-12.25
Eastern Pa.	17.00-17.50
New York, fdry.	†13.00-13.50
St. Louis	12.00-12.50
Toronto, deal'rs, net	9.50-10.00

SPRINGS

Buffalo	22.50-23.50
Chicago, leaf	24.50-25.00
Chicago, coil	26.00-26.50
Eastern Pa.	25.50-26.00
Pittsburgh	27.00-27.50
St. Louis	22.00-22.50

ANGLE BARS—STEEL

Buffalo	14.50-15.00
Chicago	23.50-24.00
St. Louis	19.50-20.00

RAILROAD SPECIALTIES

Chicago	24.00-24.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	24.00-24.50
Cleveland, billet, bloom crops	25.00-26.00
Eastern Pa., crops	27.00-27.50
Pittsburgh, billet, bloom crops	27.00-27.50
Pittsburgh, sheet bar crops	26.50-27.00

FROGS, SWITCHES

Chicago	21.50-22.00
St. Louis, cut	20.00-20.50

SHOVELING STEEL

Chicago	21.00-21.50
Federal, Ill.	16.25-16.50
Granite City, Ill.	16.25-16.50
Toronto, dealers	9.00- 9.50

RAILROAD WROUGHT

Birmingham	12.00-14.00
Boston district	†10.00-10.25
Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	20.00-21.00
Chicago, No. 1, net	18.50-19.00
Chicago, No. 2	21.00-21.50
Cincinnati, No. 2	18.00-18.50
Eastern Pa.	22.00
St. Louis, No. 1	15.50-16.00
St. Louis, No. 2	18.00-18.50
Toronto, No. 1 dlr.	15.00

SPECIFICATION PIPE

Eastern Pa.	18.00-18.50
New York	13.50-14.00

BUSHELING

Buffalo, No. 1	19.00-19.50
Chicago, No. 1	19.50-20.00
Cincin., No. 1, deal.	16.00-16.50
Cincinnati, No. 2	10.00-10.50
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new	18.00-18.50
Valleys, new, No. 1	21.00-21.50
Toronto, dealers	9.00

MACHINE TURNINGS

Birmingham	7.00- 8.00
Buffalo	13.50-14.00
Chicago	12.00-12.50
Cincinnati, dealers	12.00-12.50
Cleveland	13.50-14.00
Detroit	13.25-13.75
Eastern Pa.	15.00-15.50
New York	†10.00-10.25
Pittsburgh	15.00-15.50
St. Louis	10.50-11.00
Toronto, dealers	8.00- 8.50
Valleys	15.50-16.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.75- 9.25
Buffalo	14.00-14.50
Cincinnati, dealers	11.25-11.75
Cleveland	14.00-14.50
Detroit	13.50-14.00
Eastern Pa.	14.00
New York	†10.00-10.25
Pittsburgh	14.50-15.00
Toronto, dealers	8.00- 8.50

CAST IRON BORINGS

Birmingham	7.00- 7.50
Boston dist. chem.	†10.00-10.25
Boston dist. for mills	†9.50- 9.75
Buffalo	14.00-14.50
Chicago	13.50-14.00
Cincinnati, dealers	11.25-11.75
Cleveland	14.00-14.50
Detroit	13.50-14.00
E. Pa., chemical	15.50
New York	†10.00-10.25
St. Louis	10.50-11.00
Toronto, dealers	9.00

PIPE AND FLUES

Cincinnati, dealers	11.50-12.00
Chicago, net	14.50-15.00

RAILROAD GRATE BARS

Buffalo	15.50-16.00
Chicago, net	13.50-14.00
Cincinnati	12.00-12.50
Eastern Pa.	17.50
New York	†11.50-12.00
St. Louis	12.50-13.00

FORGE FLASHINGS

Boston district	†13.00-13.25
Buffalo	19.00-19.50
Cleveland	19.50-20.00
Detroit	16.50-17.00
Pittsburgh	19.50-20.00

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	25.50-26.00
Eastern Pa.	17.50-18.00

ARCH BARS, TRANSOMS

St. Louis	19.00-19.50

AXLE TURNINGS

Boston district	†11.00-11.50
Buffalo	16.00-17.00
Chicago, elec. fur.	21.00-21.50
Eastern Pa.	19.50-20.00
St. Louis	12.50-13.00
Toronto	9.50

STEEL CAR AXLES

Birmingham	18.00-20.00
Buffalo	22.50-23.50
Boston district	†20.00-21.00
Chicago, net	25.50-26.00
Eastern Pa.	28.00-28.50
St. Louis	24.00-24.50

SHAFTING

Boston district	†20.00-20.50
Eastern Pa.	25.50-26.00
New York	†19.50-20.00
St. Louis	14.00-14.50

CAR WHEELS

Birmingham	16.00-17.00
Boston dist., iron	†15.00-15.25
Buffalo, iron	19.50-20.50
Buffalo, steel	23.00-24.00
Chicago, iron	21.50-22.00
Chicago, rolled steel	24.00-24.50
Cincinnati, iron	20.00-20.50
Eastern Pa., iron	22.00-22.50
Eastern Pa., steel	25.50-26.00
Pittsburgh, iron	20.50-21.00
Pittsburgh, steel	27.00-27.50
St. Louis, iron	18.00-18.50
St. Louis, steel	21.00-21.50

NO. 1 CAST SCRAP

Birmingham	13.00-14.00
Bos. dist. No. 1 mach.	†15.75-16.25
N. Eng. del. No. 2	17.50
N. Eng. del. textile	18.50
Buffalo, cupola	19.00-19.50
Buffalo, mach.	20.00-21.00
Chicago, agri. net	14.00-14.50
Chicago, auto	16.50-17.00
Chicago, mach. net	18.00-18.50
Chicago, railr'd net	16.50-17.00
Cinci., mach. cup.	17.50-18.00
Cleveland, mach.	20.00-20.50
Eastern Pa., cupola	22.50-23.00
E. Pa., mixed yard	19.00-19.50
Pittsburgh, cupola	19.50-20.00
San Francisco, del.	13.50-14.00
Seattle	12.00-13.00
St. Louis, No. 1	14.75-15.25
St. L., No. 1, mach.	16.00-16.50
Toronto, No. 1, mach., net	16.00-17.00

HEAVY CAST

Boston dist. break.	†14.75-15.00
New England, del.	17.00-17.25
Buffalo, break.	16.00-16.50
Cleveland, break.	15.50-16.00
Detroit, No. 1 mach. net	13.50-14.00
Detroit, break.	14.50-15.00
Detroit, auto net	16.50-17.00
Eastern Pa.	20.00-20.50
New York, break.	†15.50-16.00
Pittsburgh	17.50-18.00

MALLEABLE

Birmingham, R. R.	15.00-15.50
New England, del.	20.00
Buffalo	23.00-24.00
Chicago, R. R.	22.50-23.00
Cinci., agri. del.	18.00-18.50
Cleveland, rail.	21.50-22.00
Detroit, auto, net	17.50-18.00
Eastern Pa., R. R.	21.00-21.50
Pittsburgh, rail	21.00-21.50
St. Louis, R. R.	20.00-20.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.50-17.00
Boston	†18.00-18.50
Buffalo	23.00-24.00
Chicago	23.50-24.00
Eastern Pa., R. R.	21.00-21.50
New York	†18.50-19.00
St. Louis	20.50-21.00

LOCOMOTIVE TIRES

Chicago (cut)	24.50-25.00
St. Louis, No. 1	20.00-20.50

LOW PHOS. PUNCHINGS

Buffalo	23.00-23.50
Chicago	24.00-24.50
Caucasian, 50-52%	44.00
So. African, 50-52%	nominal
Indian, 50-52%	nominal

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit. del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic ports

Foreign manganiferous ore, 45.55% iron, 6-10% man.	*16.00
No. Afr. low phos.	*16.00
Swedish low phos.	nominal
Spanish No. Africa basic, 50 to 60%	*15.50
Tungsten, spot sh. ton, unit, duty pd.	$22.50-23.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$24.50-25.00

*Nominal asking price.

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	44.00
So. African, 50-52%	Nominal
Indian, 50-52%	Nominal

Bars

Bar Prices, Page 104

Pittsburgh—Bar mills are steadily booking tonnages from diversified sources. Unslackened demand has allowed producers no relief from pressure for shipments, which now extend well through current quarter. Bulk of material is badly needed for immediate requirements. Price on hot-rolled bars is 2.45c, Pittsburgh, and alloy bars, 3.00c, Pittsburgh.

Cleveland — Most mills still have space on rolling schedules for some second quarter delivery. New tonnage from other than regular customers is accepted only on a spot basis, no contract business being booked. Pressure for deliveries has declined since the first of the month. Heavy shipments to steel forging, road and farm equipment concerns clearly illustrate the large requirements from these sources over the last 30 days. Most of this tonnage is for immediate consumption. Prices are firm at 2.50c, Cleveland.

Chicago—Bar shipments are being pushed but despite sold-out condition of mills, some additional business is being received. Occasionally producers are able to fit new business in early rollings but in general, delivery cannot be made before third quarter. Automotive strike settlements have permitted resumption of shipments to affected interests. A strike at the Caterpillar Tractor Co. plant, East Peoria, Ill., has stopped operations there. Other farm implement and tractor builders continue near-capacity schedules.

New York—In contrast to the delivery situation in many products commercial steel bar shipments are relatively easy at about six weeks as an average. Some producers can handle a fair variety of specifications within four weeks. In general bar sellers appear to be at least keeping pace with incoming tonnage.

Philadelphia — Commercial steel bar deliveries have shown little change over the past week, averaging around six weeks. New tonnage is in somewhat lighter volume than a fortnight ago. The market is 2.45c, Pittsburgh, or 2.74c, Philadelphia.

Cold Finished

Cold Finished Prices, Page 105

Pittsburgh — Specifications have been steady for cold-finished bars, and backlogs are undiminished. Deliveries range from one to two months, and even longer, depending on size and finish. The situation would have been much worse had it not been for the long series of automotive labor disputes, which have worked to the advantage of other consumers desirous of obtaining fairly prompt shipments.

Plates

Plate Prices, Page 104

Pittsburgh — Tank builders and marine and railroad fabricators have been specifying freely for plates. Wheeling Steel Corp. is inquiring for a twin screw towboat, and several inquiries for one to two barges are out. The navy department last week rejected four bids made Feb. 3 for construction of a drydock, involving about 3000 tons, for Pearl Harbor, Hawaii.

Cleveland — Shipments are at capacity and operations continue full with backlogs well sustained by new business that has shown only a slight recession. Considerable first quarter tonnage will be shipped this month. Mills have little room left on rolling schedules for additional second quarter tonnage. Lima Locomotive Works, Lima, O., is bidding on 20 locomotives for export for the Lineas Ferreas de Mexico railroad, involving approximately 450 tons of plates. Other inquiries are mostly under 100 tons.

Chicago—Plate mills are heavily booked for several months and the outlook for new business continues favorable. Additional orders for railroad equipment are in prospect and tank fabricators have fairly heavy backlogs and prospects for a continuation of brisk operations.

Boston—Large projects, tank and large diameter steel pipe needs, are few but strong miscellaneous demand for plates continues. Some smaller boiler shop fabricators have sought to buy more than normal, seeking additional tonnage for early delivery but without much success. One or two eastern mills offer better shipment than the average. This advantage, which has brought some volume, is less apparent than several weeks ago. Plates are firm at 2.65c, Boston.

New York—Platemakers are experiencing a recession in new tonnage, a welcome development for most, as backlogs are heavy. Some eastern producers are practically out of the market for second quarter. Opening date for bids on one to three passenger boats for the Panama Railway Steamship Co., requiring 4500 tons of hull steel each, has been postponed to April 16. Action on the steamer for the United States Lines on which Newport News Shipbuilding & Dry Dock Co. is low may not be taken for at least a fortnight, if that soon.

Philadelphia — Plate demand is easier, a situation welcomed by most producers, who are still booked a number of weeks ahead in most cases. There is a falling off, particularly in railroad specifications, following the heavy releases in the closing weeks of March before protections expired. At that time the Pennsylvania railroad made especially heavy releases for car work underway and contemplated in its own shops. It is indicated that much of the steel closed by the Pennsylvania late in March was at fourth quarter protections. The market on new tonnage is strong at 2.35c, Coatesville, Pa., or 2.435c, Philadelphia.

Washington—Bethlehem Steel Co. was the only bidder on several hundred tons of plates for the Washington navy yard, April 2, quoting $44,729.43, delivered, schedule 251. No bids were submitted on a second inquiry for plates, same schedule, and steel angles. Allegheny Steel Co., Brackenridge, Pa., was the only bidder on corrosion-resisting steel floor plates at $3,618.96, delivered Washington.

Plate Contracts Placed

1200 tons, oil barges, United States engineer, St. Louis, to Ingalls Iron Works Co., Birmingham, Ala.

340 tons, four tanks, 80,000 gallon capacity Hoffman Terminal Co., Stamford, Conn., to Chicago Bridge & Iron Works, Chicago.

235 tons, two pressure tanks, Humble Pipe Line Co., Overton, Tex., to Chicago Bridge & Iron Works, Chicago.

200 tons, 11 tanks, Neville Chemical Co., Neville Island, Pa., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

195 tons, two tanks, for Chester Engineers, Donora, Pa., to Chicago Bridge & Iron Works, Chicago.

160 tons, nine welded oil tanks, Penola, Inc., Pittsburgh, to Miles P. Brown Boiler Works, Franklin, Pa.

135 tons, barge, Standard Oil Co. of Ohio, to American Bridge Co., Pittsburgh, afloat, Leetsdale, Pa.

130 tons, standpipe, Kingston, N. Y., to Chicago Bridge & Iron Works, Chicago.

Unstated tonnage, 1,500,000-gallon elevated steel water tank, Manitowoc, Wis., to Chicago Bridge & Iron Works, Chicago; $85,800 delivered and erected.

Unstated tonnage, 200,000-gallon water tank, Evans Mills, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Plate Contracts Pending

3000 tons, small drydock, Pearl Harbor, Hawaii; four bids made Feb. 3 rejected by navy department.

700 tons, 30-inch water pipe line, Spokane; Charles Power, Spokane, low.

275 tons, plates and shapes, twin screw towboat, for Wheeling Steel Corp., Wheeling, W. Va.; bids soon.

Unstated tonnage, materials for 200,000-gallon tank, Massachusetts National Guard camp, North Falmouth, Mass., bids in.

Sheets

Sheet Prices, Page 104

Pittsburgh—Under constant heavy demand, backlogs have become larger recently in hot-rolled sheets and galvanized, while backlogs in cold-rolled, because of the automotive labor situation, have held about even. Settlement of the Chrysler strike, however, is expected to make conditions tighter. Emergency demands from some consumers confronted with loss of business or a shutdown frequently necessitate rearranging schedules. Producers are endeavoring to take care of regular customers and are rejecting offers from other sources, including some highly advantageous export business. All requirements are being scrutinized closely.

Cleveland — The anticipated recession in specifications materialized last week. However, most mills continued to place a fair tonnage for third quarter delivery at prices prevailing at time of shipment. Some consumers have already specified as much tonnage for delivery during first half as they bought for all last year. This illustrates the heavy increase in requirements and the difficulty the mills experience in allocating orders placed during the last 30 days.

Chicago—While some sheet producers are accepting business for third quarter delivery without specifying prices, other producers are refusing to book tonnages for delivery beyond June. Production continues at capacity, with additional pressure for delivery resulting from the settlement of recent automotive strikes. Other users also are seeking shipments as rapidly as possible and no lessening in consumption is apparent.

New York—Although backlogs of sheet producers are becoming increasingly heavy consumers so far have not been forced to curtail operations for lack of supply. Practically all producers now are booked well into third quarter on all grades, with few exceptions. In one case a producer is now out of the market for third quarter.

Philadelphia—While new business is somewhat less active, trading in sheets is still brisk and sellers are running further behind on deliveries. It is holding up, sellers declare, too well for comfort. Pennsylvania state opens bids April 14 on 300 tons of automobile license tag stock.

Cincinnati—Delivery problems of district sheet producers are increasing as automotive labor troubles recede. All production facilities are engaged. Delivery positions in third quarter are being taken at prices then prevailing.

Madison, Wis.—State of Wisconsin has accepted bid of Inland Steel Co., Chicago, to furnish 400 tons of No. 26 gage sheets for motor vehicle license plates for delivery to state prison at Waupun.

St. Louis—Producers and distributors of steel sheets report a continued flood of orders, and increased pressure for deliveries on material previously acquired. Some users are in a precarious condition because of inability to get sheets to apply on pressing business.

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Charging Machines, Cars, and Boxes.
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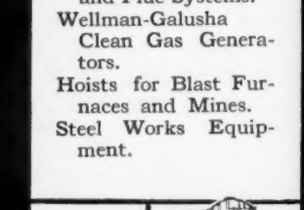
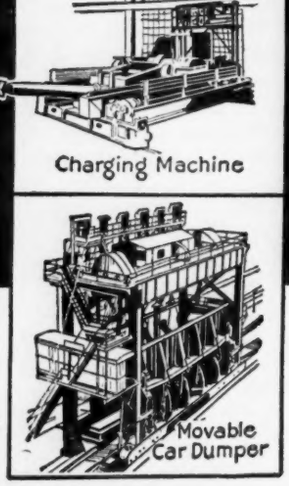

Charging Machine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Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 105

Specifications for bolts, nuts and rivets are well maintained at an active rate, reflecting heavy requirements of railroads, freight car builders, and farm implement and tractor manufacturers. Specifications from jobbers also are fairly heavy though some stocks were acquired

in closing out old contracts. Prices show a somewhat steadier tone following the latest increases.

Pipe

Pipe Prices, Page 105

Pittsburgh—Tubular goods manufacturers are building up their low stocks after the rush last month. The slackening in demand after April 1, however, has not been as great as anticipated. It is believed that line pipe projects will be more active, although at present the volume of six to twelve-mile jobs is good.

Cleveland — Specifications have slackened after the heavy buying during March, but mill operations are expected to hold at their high rate to replace depleted stocks. The hockey rink, Cleveland, and the Industrial Rayon plant in Painesville, O., are expected to require considerable tonnage of steel pipe. Demand for cast pipe is slow with sales less active than a year ago. However, considerable work is pending requiring federal aid.

Chicago—Activity in cast pipe still is slow to develop though there is a fair volume of work in adjacent districts. Inquiries and orders are principally for small lots. Demand shows little change compared with the rate a year ago.

Boston—Cast pipe buying includes two contracts totaling 700 tons. Inquiry has increased slightly. Merchant steel pipe for building construction and miscellaneous needs has developed momentum with the outlook for heating and industrial plant needs improved. Wrought pipe orders are fairly numerous in small lots.

New York—Limited to small lots, cast iron pipe buying has declined with inquiry light. The largest job to come out in the southeast this year closes April 21 at Miami Beach, Fla., 7500 tons. Several thousand tons additional for New York is expected up for bids in about six weeks. Utilities are practically out of the market after some moderate buying.

Buffalo—Pipe is moving more freely now that the season for outdoor construction is at hand. In addition to large natural gas and crude petroleum pipeline construction programs, it is understood one large firm is planning more than 100 miles of gasoline pipe for a project in western New York.

San Francisco—No new inquiries for cast iron pipe have come into the market of late and pending business does not exceed 1200 tons. Largest project awaiting final award involves 440 tons for Oakland, Calif. Awards so far this year aggregate 11,644 tons, compared with 10,377 tons for the corresponding period in 1936.

Seattle—New projects are developing slowly, none involving large tonnages. Some out-of-stock business is being done. Dealers report no difficulty in obtaining prompt deliveries.

Cast Pipe Placed

440 tons, 6 to 20-inch, East Bay municipal utility district, Oakland, Calif.; United States Pipe & Foundry Co. low on 6 and 20-inch, and American Cast Iron Pipe Co., low on 8-inch.

355 tons, 10-inch Swanton village, Vt., to Central Foundry Co., New York; $1.53 a foot, delivered.

295 tons, 12 and 6-inch, class C, Swampscott, Mass., United States Pipe & Foundry Co., Burlington, N. J.

100 tons, Salisbury, Md., to United States Pipe & Foundry Co., Burlington, N. J.; bids March 26.

100 tons, 8-inch, for Olympia, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

100 tons, Taholah Indian Agency, Wash., to American Cast Iron Pipe Co., Birmingham, Ala.

Production Facilities that give you the widest choice of sizes and shapes including cold drawn extra wide flats up to 12" x 2" . . . *Nationwide Warehouse* service through leading distributors that cuts delivery from days to hours . . . *Metallurgical Service* that helps you solve problems of structure, machinability, tensile strength, hardness and endurance values . . . three of the important factors that make Wyckoff Cold Drawn Steel Service your logical specification.

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General Offices: First National Bank Building
Pittsburgh, Pa.

Mills at Ambridge, Pa. and Chicago, Ill.

Manufacturers of Carbon and Alloy Steels
Turned and Polished Shafting, Turned and Ground Shafting, Wide Flats up to 12" x 2"

100 tons, 6-inch, De Pere, Wis., to James B. Clow & Sons Co., Chicago.

Cast Pipe Pending

7500 tons, Miami Beach, Fla.; bids April 21, city council. C. W. Tomlinson, clerk.

225 tons, 4, 6 and 8-inch, for Granger, Wash.; bids in.

130 tons, small sizes, procurement division, treasury department, for Dailey, W. Va., Glamorgan Pipe & Foundry Co., Lynchburg, Va., low; bids March 29.

Deere & Co., Moline, Ill., has purchased the factory of the former Velie Motors Corp. in that city. The plant contains 600,000 square feet of floor space.

Transportation

Track Material Prices, Page 105

Railroad buying is fairly light, following considerable activity in recent weeks. Scattering small purchases of cars and locomotives continue. Bids will go in about April 15 on the Atlantic Coast Line inquiry for cars. Awards of the 5600 cars for the Cincinnati, New Orleans & Texas have not been made since opening of bids April 10.

Rail mills experience difficulty in giving delivery as rapidly as railroads desire. New heat treating practice is slowing production somewhat in the case of a mill in the Chicago district.

Domestic freight car awards in March, totaling 8155 cars, bring bookings for the first quarter to 30,933 cars, against 9582 in the corresponding period of last year, 830 in the first three months of 1935 and 19,907 in the same period in 1934. The total also compares with 4972 in February this year. This is the largest number for first quarter since 1930. Comparisons follow:

	1937	1936	1935	1934
Jan.	17,806	2,050	24	152
Feb.	4,972	6,900	806	19,725
March	8,155	632	0	30
3 mo.	30,933	9,582	830	19,907
April		4,427	350	800
May		8,900	2	717
June		5,200	5,151	1,835
July		7,229	500	19
Aug.		225	200	105
Sept.		1,750	875	7
Oct.		2,210	1,250	75
Nov.		1,550	100	254
Dec.		23,450	10,050	110
Total		64,643	19,308	23,829

Car Orders Placed

Lake Superior & Ishpeming, 300 ore cars, to Bethlehem Steel Co., Bethlehem, Pa., with 200 having been placed previously but only recently announced.

Car Orders Pending

Royal State Railways of Siam, 100 all-steel box cars, 75 all-steel gondolas, 20 caboose cars and three tank cars, bids asked with plans available through Messrs. Sandberg, 25 Broadway, New York.

Union Pacific, 500 box cars.

Locomotives Placed

Minneapolis, St. Paul & Sault Ste. Marie, four combination passenger-freight locomotives, to Lima Locomotive Works, Lima, O.

Youngstown & Northern, one switch engine to Lima Locomotive Works, Lima, O.

Locomotives Pending

Alton & Southern, one or two locomotives, bids asked.

Lineas Ferreas De Mexico, 20 locomotives.

Santa Fe, 11 diesel-electric switching engines.

Chrome Ore Imported

Philadelphia—Chrome ore from British India, totaling 4000 tons, arrived here in the week ended April 5. Other importations were 226 tons of steel bars, 118 tons of structural shapes and 94 tons of steel

Behind the Scenes with STEEL

Crown Business

BY COURTESY of Barclays Bank Ltd. in London we are acquainted with some of the details of the forthcoming coronation ceremonies for George and Betty May 12. The sovereigns are to be crowned at Westminster Abbey, of course, and the ritual comprises five main functions—Presentation and Recognition; Administration of Coronation Oath; Anointing and Investiture; Crowning and Enthronement; and the Homage.

Route which the royal party will follow from Buckingham Palace to the Abbey and return is about as follows: Down the Mall and through the Admiralty Arch. Hairpin turn down past Whitehall to the west entrance of the Abbey. Returning right from Abbey, then left along Victoria embankment one block then left across Trafalgar Square. Then bearing left again past Pall Mall, sharply right past St. James's, and right again on Piccadilly to Piccadilly Circus. Next left onto Regent Street and left again on New Oxford Street to the Marble Arch. Through the arch and down East Carriage Road to Hyde Park Corner. Finally left through Wellington Arch, around the Victoria Memorial in front of the Palace and back home.

Is that perfectly clear to everyone?

* * *

Serial Material

OUR editors seem to be running to serial articles these days, probably with the idea they constitute good food for thought. Newest entrant is the two-part discussion of backing up refractories with insulating material, appearing on page 89.

It's written by a man who knows his insulating materials from A to Izzard, as the USSteel Corp. described its knowledge of steel sheets in last week's issue.

* * *

Catching Up

TALK about your enduring readership—we had a letter the other day asking some questions about items published in this column March 9, 1936, well over a year ago. Among other things the gentleman was inquiring about a cryptic signature we published at that time. Thorough ransacking of brain and files failed to produce a clue to the name behind the signature.

But we can insure our inquirer it was not H. L. Geiger whose series of practical articles on basic open-hearth furnaces, currently appearing in these pages, is meeting with such widespread approval among steel men.

* * *

Pilgrim Returns

EDITOR E. L. Shaner has returned from a 10-day junket through the South and East, with many interesting observations on the haunts and habits of southerners. He reports being completely captivated by the old-world charm and southern hospitality of Charleston, S. C., and amazed by the size and extent of some of the country's coast defenses.

* * *

Buzzes Orient

LONG-DISTANCE call from Detroit to Yokohama, Japan, was put through the other day, Mr. Shotaro Otake at this end talking to Mr. Tokujiro Kubota, one of Mr. Otake's men at the Nissan Jidosha Kaisha Ltd. in Nippon. It seems the Nissan people bought a lot of machinery and dies from Graham-Paige in this country and Mr. Otake called up headquarters to find out how they were working on the new model automobiles which Nissan was just completing.

Things were going along nicely, according to Mr. Kubota, and the two men talked back and forth for an hour and 15 minutes, with a few of the Graham officials chiming with questions now and then. The weather is fine in Yokohama—no dust storms or earthquakes. All the folks are well, and the national debt is still rising.

The telephone company sent a bill for $750 on the call—$10 a minute.

* * *

Birth

HEADLINE of the week: "LIFE (of Vital Parts) BEGINS"—Bethlehem Steel Co. in the March 29 issue of STEEL. Clever use of a popular phrase to call attention to the key position occupied by the open-hearth furnace.

Turning to the April 5 issue, we have instructed the vice president in charge of felicitations to advertisers to act in the case of Yale & Towne Mfg. Co., for their snappy line: "This Man Can Lift 12,000 Pounds—with a Yale Truck, of Course."

—SHRDLU

bands from Belgium; eight tons of structural shapes from France and 30 tons of ferromanganese from Norway.

Strip

Strip Prices, Page 105

Pittsburgh — Deliveries range around five or six weeks on hot strip and seven weeks on cold strip, with specifications steady and well distributed. Consumers' necessity for obtaining material quickly to fill orders apparently continues to overshadow prices. Automotive industry suppliers are under great pressure. Demand from other sources is active and the second quarter should be considerably ahead of comparable period last year, barring unforeseen developments. Hot strip is quoted 2.40c, Pittsburgh, and cold strip, 3.20c, Pittsburgh or Cleveland.

Cleveland — The delivery situation eased somewhat last week as shipments continued at the heavy rate of March, while specifications declined. This was expected by many, due to the abnormally heavy buying of the last 30 days. A fairly high proportion of recent shipments is at the lower prices, but such tonnage is expected to be cleared up by the middle of this month, certainly by May 1. Operations of auto partsmakers, small farm tool and electrical manufacturers continue to show improvement, thus affording little opportunity to build up stocks.

Chicago — Strip shipments continue heavy in keeping with loaded order books of producers and no letdown appeared in demands for as early shipment as possible. What new business is being received is for third quarter shipment at prices yet to be named. Strip consumption has been stimulated by settlement of automotive labor troubles while miscellaneous users are holding requirements at a high rate.

Boston—Cold-rolled strip buying continues heavy at 3.40c, Worcester. Demand for narrow widths and specialties comes from a broad range of consumers. Numerous buyers with first quarter orders to be shipped have placed additional tonnage at the higher prices. Some mills, although operating at capacity, will not be able to deliver all first quarter tonnage this month.

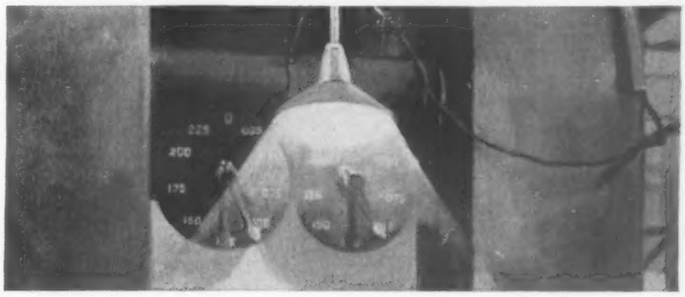
New York—Deliveries of narrow steel strip are now running into June, with automobile accessory manufacturers specifying particularly heavily.

Wire

Wire Prices, Page 105

Pittsburgh—Export demand at premiums continues heavy, while domestic business is steady. Talk of possible price changes in a few lines is heard since certain products, such as barbed wire and nails, are said to be none too well aligned with higher production costs. Sellers remain under pressure for deliveries from consumers who assert they badly need material. Some mills have had difficulty keeping up with heavy demand for certain sizes of nails. Prices are firm. It is understood that where contracts are in force, tonnages are broken down into monthly quotas and time limits specified.

Cleveland — Mills are operating at capacity in most departments as pressure for deliveries has eased only slightly. It is claimed little material is moving into stock as most tonnage shipped within the



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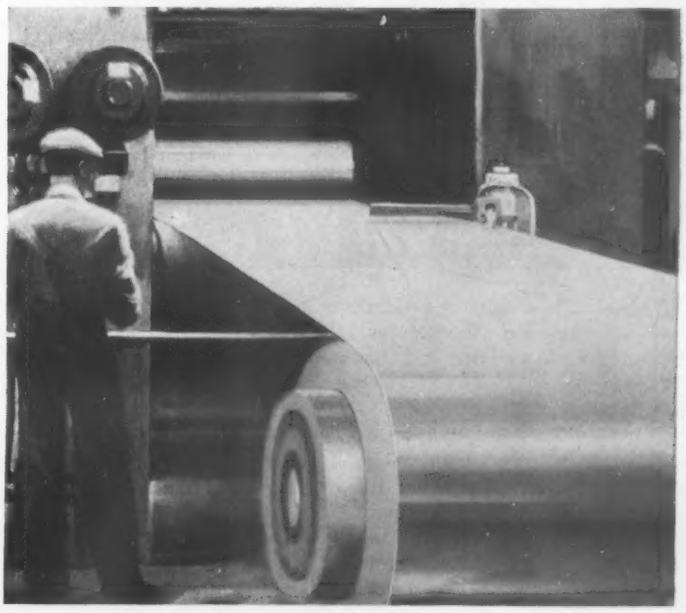
An Inland metallurgist would not attempt to answer that question for you without giving careful consideration to the needs of your product and fabrication methods.

He works with steel every day and would tell you that a lifetime would be too short to learn all there is to know about it.

You would appreciate the sincerity of his co-operation. He makes helpful suggestions for Inland customers. Sometimes it's improvement of product; quite often it's reduced manufacturing cost.



SHEETS • STRIP • TIN PLATE • BARS • PLATES • STRUCTURALS • PILING • RAILS AND ACCESSORIES

INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in: Detroit Kansas City Milwaukee St. Louis St. Paul

last month has been allocated to satisfy only actual requirements. Movement of merchant wire products is expanding as distributors prepare for rural spring buying. Demand for plain, spring and flat grades continues at a high rate.

Chicago—Wire specifications continue heavy and releases are heavier in some directions as a result of automotive strikes settlements. Deliveries of merchant products reflect improved agricultural outlook in certain districts. Indications point to one of the best winter wheat crops in recent years but moisture conditions in certain areas still are unsatisfactory. Wire mill operations continue at capacity, with second quarter output absorbed by tonnages still on books. Prices are firm, with quotations on wire products in steadiest position in years.

Boston—Most wire mills are reducing backlogs at a slightly better rate and most first quarter bookings will be shipped before the end of the month. Buying for immediate consumption continues heavy, notably manufacturers' wire and specialties. Fencing and wire guard rail cable for Connecticut highway work is in good volume. Plain wire to the manufacturing trade is firm at 3.00c, Worcester.

Shapes

Structural Shape Prices, Page 104

New York—Led by 4000 tons, west side elevated highway viaduct, structural contracts total approximately 10,000 tons in this territory. Current pending tonnage is lower. New York state, however, has resumed activity on bridge and grade crossing programs, taking bids on several projects April 20. Structural shops are generally busy with good backlogs. Plain material is 2.50¼c, New York.

Boston—New structural tonnage is coming out in greater volume, with 6000 tons for a court house in Boston outstanding. Most structural shops are operating full on fair backlogs. Plain structural material is 2.63½c, Boston.

Buffalo — Structural demand is improving steadily. Much tonnage is expected to be fabricated in Buffalo works for shipment up the Great Lakes this year and there is a good inquiry from other districts to which Buffalo steel is shipped. The outlook for this spring and summer is regarded as perhaps the best in five or six years.

Philadelphia—Considerable structural tonnage was driven in under protections on identified projects, and a still larger amount will be driven in before April 30 on still other protections. Lack of uniformity among producers with respect to policy on identified projects is said to be a major factor in the present situation. Momentarily structural awards are light, but substantial tonnage is under negotiation. It is reported that the navy has withdrawn its inquiry for a large floating dry dock to be installed on the Pacific coast.

Pittsburgh—Shape awards were heavy last week and included 18,230 tons for Great Lakes Steel Corp.'s expansion program at Detroit, placed with Bethlehem Steel Corp., Bethlehem, Pa. The volume of inquiry is expected to remain active.

Cleveland — Mills report a general increase in demand for structural steel resulting from increased requirements from private sources. Backlogs are extended four to six weeks and still expanding. Pending work aggregates over 4000 tons, the largest this year. First quarter bookings were moderately heavy considering the unfavorable weather conditions during January and February.

Chicago—Inquiries are featured by 5000 tons of plates and shapes and 3400 tons of piling for a Mississippi river dam at Cap au Gris, Mo., and 2000 tons for a Chicago viaduct. Inquiries continue in excess of awards, particularly in the immediate Chicago district where bookings recently have been light. However, shape specifications are fairly heavy and mill operations are nearly full.

San Francisco — The outstanding award went to Ingalls Iron Works,

Shape Awards Compared

	Tons
Week ended April 10	48,585
Week ended April 3	20,398
Week ended March 27	28,151
This week, 1936	18,507
Weekly average, 1936	16,332
Weekly average, 1937	28,694
Weekly average, March	28,634
Total to date, 1936	307,444
Total to date, 1937	430,417

Includes awards of 100 tons or more.

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involving 1500 tons for a dept. supply building at Sacramento, Calif., for the Government air depot. Bids have been opened on 2250 tons for crossing for the East Bay facilities yards for the San Francisco-Oakland bridge project in Oakland; J. H. Pomeroy & Co., San Francisco, is low on the general contract. Awards totaled 2180 tons, bringing aggregate for the year to 68,420 tons, compared with 37,901 tons a year ago.

Seattle — Seattle will call new bids soon for 5500 tons of transmission tower steel for the municipal light plant. Eleven tenders were returned unopened this week and specifications will be revised. Isaacson Iron Works, Seattle took 1000 tons, for buildings, warehouse and plant, for the Howe Sound Co.'s mine development in Okanogan county, Washington. Business pending includes 363 tons for the River street viaduct, Tacoma, Wash., Rumsey & Co., Seattle, general contractor.

Shape Contracts Placed

18,230 tons, open hearth building, Great Lakes Steel Corp., Detroit, to Bethlehem Steel Co., Bethlehem, Pa.

4000 tons, viaduct, west side elevated highway, 153rd-160th streets, New York, to American Bridge Co., Pittsburgh; Poirier & McLane Corp., New York, general contractor.

4000 tons, plant building, for General Motor Corp., Buffalo, to Bethlehem, Steel Co., Bethlehem, Pa.

2525 tons, balcony transfer building, Ford Motor Co., Dearborn, Mich., to J. A. Utley Co., Detroit.

1800 tons, state and city bridge, Topeka, Kan., to Kansas City Structural Steel Co., Kansas City, Kan.

1500 tons, depot supply building, Government Air Depot, Sacramento, Calif., to Ingalls Iron Works, Birmingham, Ala.

1500 tons, rolling mill and office building Bridgeport Brass Co., Bridgeport, Conn., to American Bridge Co., Pittsburgh; Stone & Webster engineers.

1350 tons, pot shells, Aluminum Co. of America, Alcoa, Tenn., to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, plant and building for Howe Sound Co. mine development, Okanogan county, Washington, to Isaacson Iron Works, Seattle.

1000 tons, building, Ford Motor Co., Norfolk, Va., to Bethlehem Steel Co., Bethlehem, Pa.

850 tons, public school 253, Brooklyn, to Bethlehem Steel Co., Bethlehem, Pa.; Reiss & Weinseir Inc., Brooklyn, general contractor.

800 tons, car unloader, Pennsylvania railroad, Erie, Pa., to Industrial Brownhoist Corp., Bay City, Mich.

790 tons, repairs, Mississippi river bridge, Minneapolis, to Minneapolis-Moline Power Implement Co., Minneapolis.

750 tons, Woolworth store, Fifth avenue and Thirty-ninth street, New York, to Bethlehem Steel Co., Bethlehem, Pa.; John Lowry Co., New York, general contractor.

700 tons, addition to assembly plant, Boeing Aircraft Co., Seattle, Wash., to Pacific Car & Foundry Co., Seattle; Austin Co., general contractor.

505 tons, including 10 tons stainless steel, embedded parts for spillway gates, Guntersville dam, Tennessee Valley authority, schedule 118859, to Lakeside Bridge & Steel Co., Milwaukee bids March 22.

460 tons, bridge, Salt Fork, Brazos river, Stonewall county, Texas, to North Texas Iron & Steel Co., Fort Worth; J. F. Buckner, Cleburne, Tex., general contractor.

450 tons, alterations to power station, for Pennsylvania Electric Co., Seward, Pa., to American Bridge Co., Pittsburgh.

420 tons, university gymnasium building, Chapel Hill, N. C., to Carolina Steel & Iron Co., Greensboro, N. C.

350 tons, boiler house, Veterans Home, Bluffton, O., to Fort Pitt Bridge Works, Pittsburgh.

315 tons, overhead bridge, Green River Wyoming, to Clinton Bridge Works, Clinton, Ia.

300 tons, state highway bridge, Bolivar, Westmoreland county, Pennsylvania, to Fort Pitt Bridge Co., Pittsburgh.

300 tons, plant addition, Celanese Corp., Amcelle, Md., to the Belmont Iron Works, Eddystone, Pa.

280 tons, storage building, Sharon, Pa., for Westinghouse Electric Mfg. Co., East Pittsburgh, Pa., to Rogers Structural Steel Co., Corry, Pa.

270 tons, hospital addition, Wilmington, Del., to Dietrich Bros., Baltimore.

265 tons, tobacco warehouse, BW Co., Louisville, Ky., to Louisville Bridge & Iron Co., Louisville, Ky.

250 tons, power houses, dams 1 and 2, Lower Colorado River authority, Beverly, Tex., to Virginia Bridge Co., Birmingham.

250 tons, paper mill buildings, Chesapeake Camp Corp., Franklin, Va., to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, theater, Graham avenue, Brooklyn, N. Y., to Berkshire Structural Steel Co., Brooklyn.

210 tons, train shed, for Crown Can Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, garage and store building addition, for the Dayton Co., Minneapolis,

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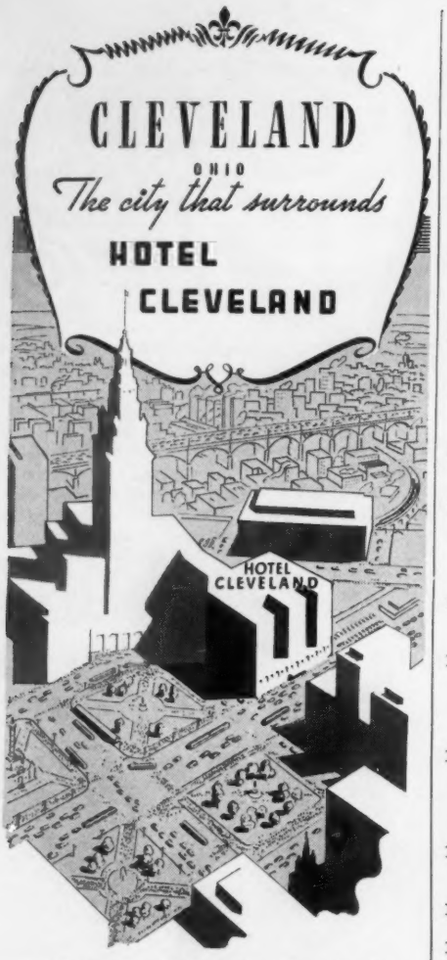

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HOTEL CLEVELAND Cleveland

to American Bridge Co., Pittsburgh.
190 tons, furnace binding and miscellaneous requirements, Bridgton, N. J., to Belmont Iron Works, Philadelphia.
180 tons, furnace steel, Owens-Illinois Glass Co., Bridgeton, N. J., to Belmont Iron Works, Eddystone, Pa.
180 tons, addition, building 7, Pittsburgh Steel Co., Allenport, Pa., to Fort Pitt Bridge Works, Pittsburgh.
180 tons, ferry slip, Exposition Grounds, San Francisco, to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.
180 tons, highway bridge Las Animas county, Colorado, to Midwest Steel & Iron Co., Denver.
175 tons, building for Tidewater Associated Oil Co., Avon, Calif., to unnamed interest.
170 tons, gymnasium, University of California, Davis, Calif., to Herrick Iron Works, Oakland, Calif.
160 tons, Pennsylvania national guard hangars, Philadelphia, to Anthracite Bridge Co., Scranton, Pa.; through Procurement division, treasury department.
160 tons, addition and alterations, Jung hotel, New Orleans, to Jones & Laughlin Steel Corp., Pittsburgh.
140 tons, garage, Eleventh avenue and Twenty-fourth street, New York, Harris Structural Steel Co., New York; Walter T. Murphy Inc., New York, general contractor.
135 tons, building addition, Herald News Publishing Co., Fall River, Mass., to Haarmann Steel Co., Holyoke, Mass.; Lockwood-Greene Inc., New York, engineers.
125 tons, underpass, Brookings county, South Dakota, to Pittsburgh-Des Moines Steel Co., Des Moines, Ia.
125 tons, beam bridge, Frazeyburg, O., to Dover Tank & Plate Co., Dover, O.
125 tons, bridge, Alason, Mich., to Duffin Iron Co., Chicago.
115 tons, factory building, Joyce-Cridland Co., Dayton, O., to the Burger Iron Co., Akron, O.
115 tons, bridge WPGM-52, Minnehaha county, South Dakota, to Des Moines Steel Co., Des Moines, Ia.
100 tons, shapes and bars, post office and courthouse addition, Canandaigua, N. Y., to Genesee Bridge Co., Rochester, and Bethlehem Steel Co., Bethlehem, Pa.; John W. Cowper Co., Buffalo, general contractor.
100 tons, post office, Panama City, Florida, to Ingalls Iron Works, Birmingham, Ala.; also 50 tons of bars, to Concrete Steel Co., Birmingham, Ala.; Beers Construction Co., Atlanta, Ga., general contractor.
100 tons, two radial gates, Caballo dam, New Mex., to unnamed interest.

Shape Contracts Pending

8400 tons, including 3400 tons of piling, Mississippi river dam No. 25, Cap au Gris, Mo.
6000 tons, courthouse, Boston.
5500 tons, transmission towers, Seattle light department; new bids soon under revised specifications.
4600 tons, building, St. Louis.
2250 tons, crossing for East Bay facilities yards, San Francisco-Oakland bridge project, Oakland, Calif.; J. H. Pomery & Co., San Francisco, low on general contract.
2000 tons, East 103rd street viaduct, Chicago; bids to commissioner of public works April 27.
2000 tons, refinery, Dallas, Tex.
1300 tons, state highway bridge, Juniata county, Pennsylvania; John H. Wickersham, Lancaster, Pa., low at $223,639.12 on April 2 bids.
700 tons, building, Toledo, O.
500 tons, Central Tower, San Francisco Exposition; bids April 15.
500 tons, factory, Owensboro, Ky.
428 tons, state highway bridge, Lycoming county, Pennsylvania; Robert C. Reitz, Rohrerstown, Pa., low at $198,499.48 on April 2 bids.
400 tons, boiler house extension, for West Virginia Pulp & Paper Co., Luke, Md.
363 tons, state bridge River street, Tacoma, Wash.; Rumsey & Co., Seattle general contractor.
360 tons, bridges, Flushing, N. Y., contracts 10 and 3, World's Fair construction.
350 tons, school, Port Byron, New York; Duplex Construction Co., Glens Falls, N. Y., general contractor.
250 tons, building addition, for Connecticut General Life Insurance Co., Hartford, Conn.
200 tons, junior high school building, Lexington, Ky.
210 tons, addition, Eastern high school, Washington, D. C.
125 tons, Loganville bridge, Sauk county, Wisconsin; bids April 16.
120 tons, I-beam bridge, Bucks county, Pennsylvania; bids to state highway department, Harrisburg, Pa., April 16. also 46 tons of plain steel bars.
100 tons, building, Container Corp., Van Wert, O.; bids in.

Reinforcing

Reinforcing Bar Prices, Page 105

Pittsburgh—Awards ranging from 250 to 1000 tons each were heavy last week, and inquiries include a number of fair-sized projects. Public work is becoming more active. Prices are steady.

Cleveland — The estimated reinforcing bar requirements during March from private sources totaled 412 tons; joists 166. This compares with 168 tons and 163 tons respectively for February. Awards are limited to lots well under 100 tons, but pending work includes considerable tonnage for the hockey rink, Cleveland, a plant building in Painesville, O., for the Industrial Rayon Co., Cleveland, and grade crossings at Akron, O. Mill backlogs have expanded moderately, due to seasonal influences.

Chicago—Awards are limited to small lots which are fairly numerous. Pending business is increasing

Concrete Awards Compared

	Tons
Week ended April 10	**4,727**
Week ended April 3	**3,570**
Week ended March 27	**3,878**
This week, 1936	**3,078**
Weekly average, 1936	**6,005**
Weekly average, 1937	**3,987**
Weekly average, March	**5,402**
Total to date, 1936	**112,624**
Total to date, 1937	**60,018**

Includes awards of 100 tons or more.

and prices are firmer. Inquiries include 900 tons, building, for Acme Steel Co., Chicago.

Boston — Reinforcing steel requirements are on the uptrend, largely for bridges and public works. Connecticut highway projects account for 255 tons in several jobs. Low bids by contractors for this work were 24.00c a square yard for mesh in place and 4.00c on deformed bars. New quotations on 340 tons, bridge substructure, Deer Isle, Me., went in April 7. Hartford, Conn., sewer construction requires 350 tons, two contracts. Prices are still inclined to be unsteady.

New York—Tonnage bought approximate 1000 tons, led by 600 tons for a viaduct. Prices on considerable new material recently placed have failed to reflect fully the recent $6 advance and shading continues. Building mesh volume is ahead of last year, but still not heavy, about 200 tons pending for a hospital on Welfare Island. Governor of New Jersey has vetoed a bill for the diversion of highway funds, a proposal which has been holding up bridge and road requirements in that state.

Philadelphia—Although still not subject to much test, reinforcing bar prices are firming. Most sellers are now quoting at the equivalent of 2.84c, Philadelphia, plus 10 cents for trucking. An outstanding award recently involved 200 tons for a furniture warehouse in Allentown, Pa. Some substantial school work is in prospect.

San Francisco — Mills are booked close to three months in advance and demand is holding up well, although few awards in excess of 100 tons were placed. Awards aggregated only 669 tons, bringing the total for the year to 20,932 tons compared with 74,438 tons in 1936. The bureau of reclamation has just opened bids, under invitation B-33,-500-A, for 1572 tons to be delivered at Pomona, Wash.

Seattle — Important new projects are lacking, but mills continue at capacity with orders placed before the price advance. Construction projects are developing slowly with recent placements mostly under 100 tons. State highway jobs are coming up for figures in increasing numbers. The merchant bar market is inactive, dealers having replenished stocks at former price levels.

Reinforcing Steel Awards

650 tons, filtration plant, Minneapolis, to Cowin Co., Minneapolis.

600 tons, viaduct, west side elevated highway, 153rd-160th streets, New York, to Truscon Steel Co., Youngstown, Ohio; Poirier & McLane Corp., New York, general contractor.

600 tons, rail steel, grain elevator, for National Milling Co., Milwaukee, to Worden-Allen Co., Milwaukee.

355 tons, plant building, United Shoe Machinery Corp., Beverly, Mass., to Joseph T. Ryerson & Son Inc., Cambridge, Mass.; Morton C. Tuttle Co., Boston, general contractor.

310 tons, PWA project, Syracuse, N. Y., to Concrete Steel Co.

300 tons, rail steel, building, for National Milling Co., Toledo, O., to Calumet Steel Co., Chicago.

260 tons, plant addition, Nashua Mfg. Co., Nashua, N. H., to Joseph T. Ryerson & Son Inc., Cambridge, Mass.; Morton C. Tuttle Co., Boston, general contractor.

220 tons, cadet armory, West Point military academy, New York, to Carroll-McCreary & Co. Inc. New York; Edmund J. Rappoli Co., Cambridge, Mass., general contractor.

200 tons, warehouse, Van Sciver Furniture Co., Allentown, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.

200 tons, printing plant, for McBee Printing Co., Athens, O., to Austin Co., Cleveland.

190 tons, grade crossing elimination, Elizabethport, N. J.; through P. T. Cox Contracting Co., to Bethlehem Steel Co., Bethlehem, Pa.

183 tons, water filtration plant, Erie, Pa.; Platt Construction Co., contractor, to Bethlehem Steel Co., Bethlehem, Pa.

179 tons, Salt Fork, Brazos river, Stonewall county, Texas, to North Texas Iron & Steel Co., Fort Worth; J. F. Buckner, Cleburne, Tex., general contractor.

178 tons, bureau of reclamation, invitation 44,116-A, Potholes, Calif., to Soule Steel Co., San Francisco.

177 tons, bureau of reclamation, invitation A-42,202-A, Knob, Calif., to Colorado Fuel & Iron Co., Pueblo, Colo.

125 tons, bureau of reclamation, invitation 25,565-A, Hatch, New Mex., to Colorado Fuel & Iron Co., Pueblo, Colo.

Reinforcing Steel Pending

900 tons, building, Acme Steel Co., Chicago.

800 tons, rail steel, jail, Sandstone, Minn.

641 tons, Mississippi river dam No. 25, Cap au Gris, Mo.

501 tons, Vignes crossing for Los Angeles; bids soon.

350 tons, Suffolk county court house, Boston.

340 tons, substructure, bridge, Deer Isle, Me.; Coleman Bros. Corp., Boston, low.

280 tons, state viaduct, River street, Tacoma, Wash.; Rumsey & Co., Seattle, general contractors.

255 tons, bars and reinforcing fabric, bridges and highways, Connecticut; bids in.

200 tons, building, for Atlantic Refining Co., Philadelphia.

200 tons, office building, for National Portland Cement Co., Philadelphia.

200 tons, 133rd street viaduct, Chicago; bids April 27.

200 tons, upper Desplaines sewer, Chicago Sanitary district; bids April 22.

170 tons, fish pier, substructure, Gloucester, Mass.; Bay State Dredging & Contracting Co., Boston, low.

160 tons, bureau of reclamation, invitation A-42,220-A, Holtville, Calif.; bids opened.

150 tons, state highway projects; bids at Olympia, Wash., April 20.

135 tons, warehouse, Central Steel & Wire Co., Chicago.

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111 tons, bureau of reclamation, invitation 38,380-B, Odair, Wash.; bids opened.

111 tons, state highway bridge, Juniata county, Pennsylvania; John H. Wickersham, Lancaster, Pa., low on general contract.

100 tons, state highway bridge, Lycoming county, Pennsylvania; Robert C. Reitz, Rohrerstown, Pa., low on general contract.

Pig Iron

Pig Iron Prices, Page 106

Pittsburgh—In view of undiminished heavy demand, April pig iron shipments probably will equal March. Producers are encountering one of tightest situations in many years for they have had little opportunity to build up badly depleted stocks. Additional capacity is believed limited by coke scarcity. Foreign inquiries continue numerous.

Cleveland — Producers have entered second quarter with stocks badly depleted and bookings exceptionally large. The month is expected to show a let up in sales and shipments in contrast to those of March, which were better than any month since 1929. Books of merchant sellers are fairly well cleared of iron taken at lower prices. Foundry operations continue heavy in most directions.

Chicago—Despite heavy coverage by foundries on second quarter needs, new pig iron business is in fair volume. Producers' backlogs already represent practical production limit during ensuing three months and second quarter shipments will approximate heavy first period volume. Foundries' stocks are smaller than was anticipated early this year and no slackening in operations is noted except in instances where strikes have closed plants.

Boston—Larger consumers in a position to do so are showing more interest in pig iron for third quarter. With stocks still ample in most such cases, however, buying for that period is not heavy. Sellers do not appear anxious to sell much beyond this quarter at present prices. Current buying in small lots for early shipment is moderate. Opening of the New York barge canal allows shipments from Beacon, N. Y. First shipments against the 35,000-ton purchase from Mystic Iron Works by Japan have been made and about 6500 tons more will be loaded next week.

New York—The heavy movement of pig iron continues. Volume is being augmented by several thousand tons of barge iron now reaching this district after having been frozen up this winter en route from Buffalo. Foreign inquiry continues active although few new sellers have been reported. Apparently foreign buyers and domestic sellers are having difficulty getting together on price. A much stiffer attitude is being taken by domestic sellers.

Buffalo—Inquiry for pig iron has quieted to a minimum for the current year, due to heavy purchases rather than to decrease in melt. A brisk commerce on the barge canal and the Great Lakes is indicated as navigation opens. More than 10,000 tons of iron will move by these two routes in April, establishing the heaviest movement of iron by water from Buffalo furnaces in all time.

Four barges loaded 2000 tons of pig iron at the Wickwire furnace this week, ready to depart for eastern seaboard as soon as navigation opens. This will be one of the earliest eastbound movements of pig iron from this port in recent years.

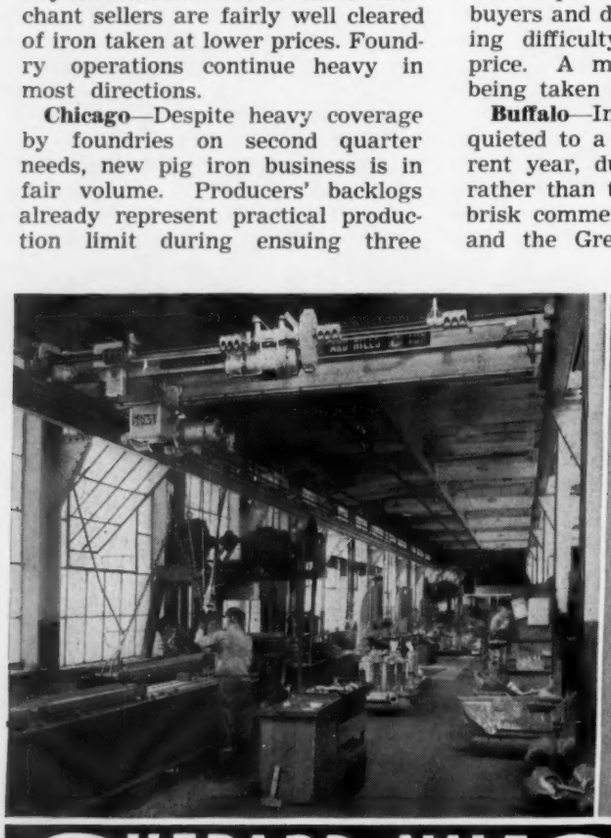
Philadelphia—As most pig iron buyers are under contract, new domestic business is spotty. However, a heavy tonnage is being melted with the market exceedingly strong. Fewer indications of a further advance are seen at this time than a week ago, but possibility of a mid-quarter increase is still present.

Cincinnati—Foundries have laid down considerable pig iron, shipped last month against contracts, and little new buying is being done. Reports of higher prices on the way, unconfirmed and doubted in some quarters, drove in orders for several thousand tons for second quarter delivery, but this buying has subsided. The melt continues heavy.

St. Louis—March shipments of pig iron exceeded any month on record. The movement during the first quarter also made a new peak, being ahead of those during 1929 and approximately 50 per cent above the first three months of 1936. Some scattering sales are reported, but tonnages are light as melters are well covered and blast furnaces have little to sell.

Birmingham, Ala.—Pig iron production is at a high rate, the best since 1930. Shipments are heavy and yard stocks have been reduced considerably. Melters are pressing for further deliveries.

Seattle—The market is strong, Columbia iron, 1.75 to 2.25 silicon having advanced from $18.50 to $21, delivered. Deliveries are prompt as stocks are ample. The present price is until June 30 only, and no orders beyond that date are being accepted. Some India iron is being received here but domestic iron is supplying most of the demand. Volume of business is good although iron foundries are not as active as steel plants. Foreign pig iron is reported to have been sharply advanced at source and it is doubtful if it is in competitive position now.



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Ferroalloys

Ferroalloy Prices, Page 106

New York—Tungsten prices are advancing so swiftly, with indications of still further increases, that

sellers are accepting tonnage only for spot contract and are moving cautiously in even doing that. The market today appears to be around $22.50 to $23 per ton unit, duty paid, but this is tentative.

As noted in a recent issue, prices are said to be the highest in peacetime history, with the market being governed largely by the pace being set in the European markets. Ferrotungsten has also undergone sharp advances recently, reflecting this general situation in tungsten ore.

Ferroalloy prices in general are more stable, with little change expected over the remainder of this quarter.

Scrap

Scrap Prices, Page 108

Pittsburgh—No. 1 heavy melting is off another 50 cents in this district as a result of numerous factors, including a disposition on the part of mills to refrain from purchasing. Dealers have been picking up tonnages at prices well below the quotable range and it is apparent that mills could buy under last week's prices. Although the psychological factors are bearish the situation easily could be reversed, for mill operations still are strong. One large broker is making no attempt to buy or sell at present.

Cleveland—Higher prices were paid for New York Central railroad scrap offerings last week than had been expected. A leading consumer bought No. 1 heavy steel at $23.50 for Youngstown, O., delivery and also at $23 for Farrell, Pa., delivery from the Erie railroad. It is understood here that the Baltimore & Ohio also sold to this buyer at a price equivalent to $23.66 plus freight. New York Central car wheels went at around $23, Mansfield, O., car specialties at $28, short rails at $27 and long rails at $26.

Meanwhile, other buyers declare they are out of the market temporarily, this after absorbing some of the surplus and banked up scrap tonnage originally earmarked for export but embargoed along the Atlantic coast. The next purchases are expected to disclose the actual state of the northern Ohio market.

Chicago—Scrap has an easier tone though prices generally are unchanged. Last sales of No. 1 heavy melting steel were $21.50 and mills and sellers are awaiting outcome of recent unsettlement in commodity and security markets. Scrap offerings are heavier, due particularly to the fact that producers and small sellers are taking advantage of current prices by offering larger tonnages than are available for immediate shipment.

Boston—Several scrap grades for domestic shipment are higher, including borings and turnings, shafting and most cast classifications. For export, heavy melting steel prices are unchanged. Movement of these grades to the Pittsburgh district is small. Stove plate has brought $14.50, docks, and $15.50 is paid for No. 2 cast. Most heavy melting steel going to docks is No. 2. Arrival of more boats and heavy loading for export has further eased the railroad embargo.

Philadelphia—While scrap is coming out more freely, prices on leading grades of steel and cast scrap are unchanged for domestic consumption and on steel for export have undergone further advance. Moreover, some railroad specialties have also been advanced in price. Certain trade leaders look for even higher prices in steel and cast grades, as exporters of steel scrap are becoming more active and as the supply of cast scrap continues scarce.

New York—The first decline for many weeks in scrap prices is a reduction of 50 cents a ton by brokers for car loading in this district. With $17.50, f.o.b., as top for rail shipment, the export price, dock delivery, is unchanged at $18. While other grades for all deliveries are unchanged, the steady advance prevalent during the last few months appears to be halted, temporarily at least. Buying is also slower. Reopening of the New York state barge canal finds practically no scrap to be released for this port, although some is expected to move up state by this route within the next few weeks.

Buffalo—Scrap holds steady and is in excellent demand. While last tonnage sales of No. 1 heavy melting steel were made at $20.50 it is understood some smaller lots may have brought $21. Reports also are heard that No. 2 heavy melting steel has sold in the district as high as $20 although the usual differential would place the value of the latter material at $19 to $19.50.

Cincinnati—Dealers have dropped buying prices on iron and steel scrap. Mills are taking scrap steadily in unimportant tonnages, and demand for foundry grades is active.

Detroit—Some weakness has appeared in the steel and iron scrap market without a change in prices, although a slightly lower level is ex-

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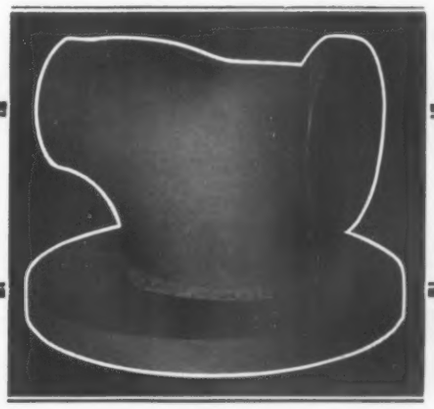

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pected. Dealers on the long side are somewhat disturbed. Reduction of the volume of export buying is believed to be the cause of the easier situation.

St. Louis—Purchasing of iron and steel scrap has been in moderate volume, but the movement is brisk, and many industries are pressing dealers for deliveries. Consumption is being maintained at the recent high rate, with steel casting plants accounting for relatively the largest tonnages.

Seattle—The strong tone has stimulated shipments from the country and receipts have been heavy. Local mills have ceased buying temporarily, due to yard congestion, some 300 cars being reported on track awaiting unloading. While the mill price is nominally $12, lack of domestic support has weakened the situation to some extent. Japanese buyers are still active but exporters will book only if and when ocean space is available.

Warehouse

Warehouse Prices, Page 107

Pittsburgh—One warehouse reports that last month's tonnage was better than any month since September, 1929. Only a slight slackening in demand has been noted despite the fact that buyers sought to protect themselves. Some warehouses are having difficulty getting certain products, such as sheets, to keep their stocks up to an adequate level. Prices are steady.

Cleveland — Warehouse distributors report orders have fallen considerably behind last month. March is usually the best month of the year. Requirements are well diversified with structural demand improving.

Chicago—Sales are well sustained but show little change from the rate a month ago. Numerous buyers seeking prompt delivery on material not available from mills are contributing a large share of warehouse bookings. Prices are steady.

Philadelphia — Leading distributors report March business the best for any month in recent years and look for no appreciable falling off, although most jobbers hesitate in predicting another banner month. Prices are strong but unchanged.

Cincinnati — Brisk demand for warehouse products is only a few points below March volume, and continues chiefly from industrial users. Sales of sheets are undiminished. Building materials lag. Prices are firm and unchanged.

St. Louis—Warehouse business during March exceeded that of any month since the predepression era. Demand is well diversified, but centers chiefly in sheets, plates and other rolled material, due to deferred mill deliveries. Rehabilitation operations in the flood areas has substantially swelled sales volume.

Newark Wire Cloth Co., Newark, N. J., manufacturer of high grade woven wire screens, and wire cloth products, has appointed the J. K. Porter Co., Pittsburgh, as its agent to cover western Pennsylvania.

Tin Plate

Tin Plate Prices, Page 104

Pittsburgh—The nominal advance of 50 cents per base box which went into effect last week is expected to result in customers' utilizing present contracts to the fullest extent. The increase, first since December, 1933, brings prices into better alignment with production costs, but most of the material shipped between now and next fall will not command the higher figure. Despite the sold-out condition, sellers have been receiving numerous offers of large tonnages, both for domestic and foreign consumption. Shipments, which in the first quarter were well ahead of the comparable period last year, continue at a high rate. Under the new prices, coke tin plate is $5.35 per base box, Pittsburgh, and $5.45, Gary; special coated manufacturing ternes, $4.65 per base box, Pittsburgh, and $4.75, Gary.

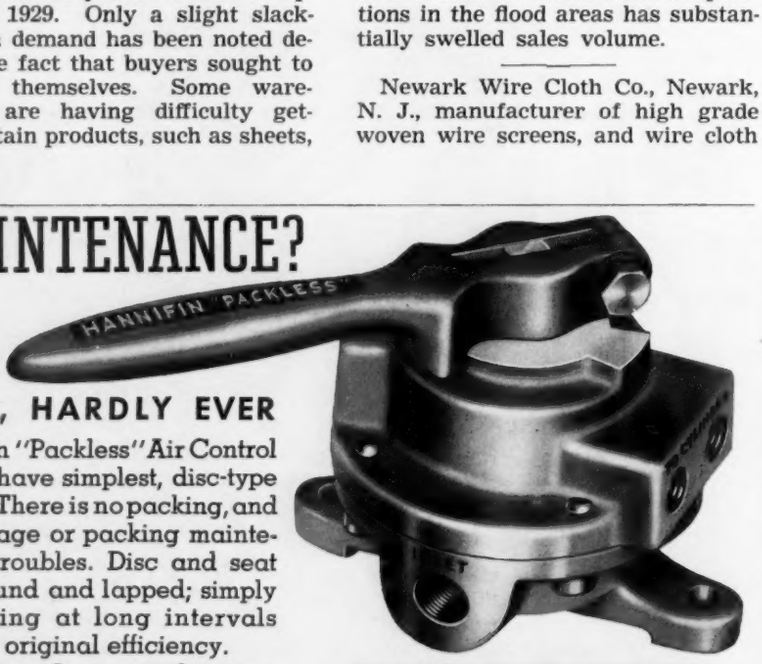
New York—Inasmuch as most tin plate requirements are under contract until Oct. 1, the newly announced $10 advance will affect only a relatively small tonnage; however, it will discourage spot speculative demand, which producers much desire, and will automatically increase export prices, as already witnessed in new quotations on tonnage for foreign shipment. In this respect it may have the effect rather of raising the general level of the export market to a little higher than the premium levels which have been quoted in recent weeks. The advance may also have the effect of stimulating contract customers, who are still under protection at the old price, in efforts to purchase more than current requirements call for; however, sellers assert there is just so much tin plate to go around, little more than last year, and that consequently they will continue every effort to keep specifications reasonably within the limits set by contract customers' requirements last year.

Metallurgical Coke

Coke Prices, Page 105

Several independent oven operators in the Connellsville region have announced an advance of 35 to 40 cents a ton in the price of beehive coke. This would bring foundry coke prices to about $5.25 a ton, ovens, and furnace fuel prices to around $4.25 a ton. Higher miner

MAINTENANCE?



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wages, social security taxes, increased compensation costs, to say nothing of the biggest demand for coke since the World war, are the prime reasons for the price rise, say operators.

After the short halt resulting from the miners' strike, coke production resumed its unusually active rate, with pressure for shipments intensified as a result of the lay-off. A few western Pennsylvania mines were idle most of last week pending ratification of the agreement reached in New York. Because of this and other factors sellers of both coal and coke were slow to announce new prices, but it was generally believed that the increase would be at least 25 cents per ton on coke. On spot business of one or two carloads recently the price has been as high as $4.75 to $4.85. Meanwhile, some observers in the Connellsville, Pa., district asserted it was doubtful if enough additional beehive coke producing capacity could be found to supply even one more furnace at this time. Operators have already repaired most of the ovens which could possibly be utilized and are still short of the demand. An independent steel producer in the Pittsburgh district has reconditioned a battery of old beehive ovens long unused.

Following recent changes in New England, foundry by-product coke has been advanced to a spread of $10.85 to $11.30, delivered, Newark, N. J., and to $10.60, delivered, Philadelphia.

British and European coke, which supplies the Pacific coast, quoted at $14.50, net ton, delivered buyers' plant, is expected to advance $1 in the immediate future due to increased production costs and higher ocean freights.

Steel in Europe

Foreign Steel Prices, Page 107

London — (*By Cable*) — Shortage of pig iron, scrap and semifinished steel in Great Britain continues to hamper production and some steel consumers have been forced to work short time because of inability to obtain material. Some export trade continues to be served. New bookings are few and no contracts are considered for delivery before second half year and then only at prices prevailing at time of delivery. Practically all departments of the steel industry are booked fully for first half, working at capacity.

The Continent reports export demand continues active and premiums are still offered, but more conservatively.

Iron Ore

Iron Ore Prices, Page 108

New York — Established by scattered cargo lot sales, the market on manganese ore continues its sharp ascent, Caucasian ore, 50 to 52 per cent, having recently been booked at 44 cents per unit, not including duty. High grade South African and Indian ore is now virtually unobtainable, with the market purely nominal at around the same figure.

Nonferrous Metals

Nonferrous Metal Prices, Page 106

New York — Major nonferrous metal prices slumped last week in one of the most provocative markets in the industry's history. Weakness was attributed to heavy liquidation of speculative holdings stimulated by

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fear that the various governments might institute some form of control to check the advance in commodity prices.

Copper — Electrolytic declined from 17.00c, Connecticut, to 16.00c and finally to 15.50c. Primary mine producers withdrew from the market at the lower level established by custom smelters. All allied products also eased. Export copper closed at around 15.50c, c.i.f.

Lead—All leading sellers lowered base prices $18 to $20 per ton to the basis of 6.00c, New York, and 5.85c, East St. Louis. Demand was active at the new levels.

Zinc—Prime western zinc eased $10 per ton to 7.00c, East St. Louis, despite the fact that statistics revealed a drop in stocks to only 18,183 tons compared with March shipments of 59,635 tons.

Tin—Straits spot eased to around 60.25c from 62.87½c at the beginning of the week. Consumer buying interest was generally dull.

Antimony—Chinese spot held unchanged at 17.00c, duty paid New York, but American spot declined ⅜-cent to 16.12½c.

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Mirrors of Motordom

(*Concluded from Page* 42)

Republican candidates for state offices were given the nod. The vote was light, and no important issues other than sentiment on the state's handling of sitdown strikes were involved.

Reports that Governor Murphy postponed settlement of the Chrysler strike until after the election prompted the belief he was apprehensive over the result, fearing whatever type of settlement was effected would hurt the Democratic vote.

NEW model and increased production are planned by Stout Motor Car Corp. here, builder of the Stout Scarab. Priced at around $2500, the new Scarab will include present features of the $5000 Scarab, but dies for body stampings are being ordered to permit increased production and cost savings over the present hand-built models. . . . Two new models in the medium price range—a six and an eight—are being proposed by Hupp, now in process of reorganization and refinancing . . . Index of industrial employment in Detroit dropped from 128.4 on Feb. 15 to 87.3 on March 31, reflecting serious effect of the Chrysler and Hudson tieups . . . . "Citizens of Michigan" organization expects to have 200,000 petitions, urging respect for law and order, to lay on the governor's desk shortly . . . . Electric power consumption by Ford Motor Co. in Detroit area for 1936 set an all-time record—724,567,451 kilowatt-hours—practically all produced in the company's own power plants . . . . Nissan Jidosha Kaisha Ltd. in Yokohama, Japan, has started to move from assembly lines the first cars made with dies and tools bought from Graham last year . . . Heat treating furnaces, lathes, gear cutters and other production equipment valued at $100,000 have been purchased by Four Wheel Drive Auto Co., Clintonville, Wis., to expand plant capacity.

Equipment

Boston—New England grinding machine builders shared liberally in recent heavy buying by bearing plants. A Newark, N. J., bearing producer bought about 30 tools, most of them grinders. Worthington Pump & Machinery Corp., Harrison, N. J., is retooling its Holyoke, Mass., plant, closed since 1922. Most machine building shops are at capacity with large backlogs. One Worcester grinding machine builder promises delivery on standard tools in 10 to 12 weeks.

New York—Additional price advances have been made on some machinery, notably the heavier lines. Despite large backlogs and with deliveries extended several months in many instances, new buying is well sustained. Demand is especially brisk for metalworking production tools. General Electric Co., Otis Elevator Co., Hyatt Bearings division, General Motors Corp. are among recent buyers. Warner & Swasey Co., Cleveland, is low on five turret lathes for Norfolk, Va., navy yard. Inquiry also is heavier for metalworking tools at several eastern arsenals and armories.

Cleveland—Dealers' inquiries and sales have eased slightly following April 1 price advances. Small orders, however, continue in fair volume. Little gain has been made in deliveries. The New York Central railway is reported buying tools, principally heavy items.

Chicago—Most types of machinery and plant equipment continue active. Machine tool market, though affected somewhat by recent price increases, reveals unimproved deliveries and substantial inquiries. Tool manufacturers have made little progress in expanding output, being limited by an inadequate skilled labor supply and by insufficient production facilities. In some cases where deliveries are extended well beyond midyear, prices are not being quoted. Railroad inquiry is more active than at any time since before the depression. Small tool buying continues brisk.

Seattle—Largely expanded mining activities in the Northwest and Alaska are stimulating demand for machinery and equipment. Strikes are hampering fishing and canning and some equipment orders have been canceled. Road machinery, pumping equipment and electric items are strong.

Construction and Enterprise

Ohio

BEDFORD, O. — City rejected bids taken March 26 for construction of sewage disposal plant at an estimated cost of $140,000 and will probably advertise for new bids soon. Arthur Wedge is city manager; R. F. MacDowell, Chester-twelfth building, Cleveland, is consulting engineer. (Noted March 22).

BELLEFONTAINE, O. — Service safety director, T. C. Vanica, will receive bids until April 16 for construction of improvements to utility plants and distribution systems, including voltage regulators, switchboard panels, traveling crane and water meters.

BEREA, O. — City is completing plans for light and water plant improvements, including new turbo-generator and high efficiency boiler. Total cost is expected to be about $200,000. John Baesel is mayor; William C. Kammerer & Associates, 710 Smythe building, Cleveland, is consulting engineer.

BLUFFTON, O. — Central Ohio Light & Power Co., Findlay, will have plans ready soon for construction of high pressure steam generating plant here at an estimated cost of $1,200,000. Maturity is dependent upon bond sale. Sargent & Lundy, Chicago, Ill., are engineers. (Noted April 5).

CLEVELAND — American Coach & Body Co. has sold its plant No. 2 at West Fortieth street and Clark avenue, to interests identified with Herold Mfg. Co., 1104 West Ninth street.

CLEVELAND — Perfection Tool & Machine Co. has been organized by J. E. Splittorf and associates. Cannon, Spieth, Taggart, Spring & Annat, Union Trust building, are correspondents.

DAYTON, O. — Office of contracting officer, air corps, war department, Wright field, will receive bids until April 16 for two gas-electric plants, 110-volt, 60-cycle, 1000-watt; and one portable power plant, 12-volt, 1000-watt, gasoline-driven, circular 37-644 (as amended); until April 23 for 38 abrasive machines of various types for grinding and polishing, circular 37-641, F.O.B. contractor's plant. R. W. Propst is contracting officer.

DELPHOS, O. — Construction of city's municipal light plant has been held up, will probably ask for bids in about 60 days. W. H. Taylor is mayor; Carl Simon, Van Wert, O., is consulting engineer. (Correction from item of March 29).

DOVER, O. — Dover Appliance Co., subsidiary of Knapp-Monarch Co., St. Louis, will modernize plant and install new machinery to manufacture electric irons. Cost is estimated at $50,000. Norman D. Vea is general manager.

TOLEDO, O. — Fort Pitt Steel Co., 397 Philips avenue, is starting construction of sheet steel warehouse. It will provide 30,000 square feet of floor space and will be equipped with shearing and slitting facilities. Cost is estimated at about $150,000.

Massachusetts

SAUGUS, MASS. — Eastern Tool & Stamping Co. Inc., Ballard street, suffered heavy fire damage recently.

New York

BUFFALO — Seneca Steel & Supply Co., 605 Ellicott square, has been registered by Valentine B. Schupp, 240 Linden avenue.

BUFFALO — United Diesel Corp. has been incorporated here; Donnelly & O'Neil, 606-607 Erie County Bank building, are agents.

BUFFALO — F. H. McGraw Corp., 51 East Forty-second street, New York, N. Y., has bid approved for construction of incinerators for Buffalo sewage disposal plant project. The McGraw bid of $258,000 was low for the job.

BUFFALO — Chevrolet Motor Car Co., 420 West Milwaukee avenue, Detroit, plans construction of $4,000,000 plant on River road here. Alfred G. Gulliver, general manager of the company's Saginaw, Mich., parts manufacturing division, has been appointed general superintendent of construction. (Noted April 5).

GENEVA, N. Y. — Finger Lakes & Hudson Flour Co. plans erection of grain elevator at a cost of $40,000.

NEW YORK — C. Tennant Sons & Co., 19 West Forty-fourth street, moved

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its offices April 9 to room 1903, 9 Rockefeller Plaza.

NEW YORK — Strickland Foundry & Machine Works Inc., 516 West Thirty-sixth street, has leased 1-story building, 50 x 100 feet, at 581-583 Eleventh avenue, and plans expansion.

NEW YORK — United States engineer office, room 710, Army building, 39 Whitehall street, will receive sealed bids until April 29 for construction and delivery of two steel-hulled, steam-driven derrick lighters.

SYRACUSE, N. Y. — National Biscuit Co., 449 West Fourteenth street, New York, plans construction of factory branch and distribution unit on Teall avenue. Cost, with equipment, will be over $120,000.

New Jersey

RARITAN, N. J. — Board of commissioners, town hall, receives proposals until April 20 for construction of sewage treatment plant. Remington & Goff, 509 Cooper street, Camden, N. J., have plans and specifications.

SOMERVILLE, N. J. — Borough receives bids until April 26 for construction of sewage disposal system. Remington & Goff, 509 Cooper street, Camden, N. J., have plans and specifications.

Pennsylvania

PITTSBURGH — Chase Brass & Copper Co., 855 West North avenue, is building warehouse and office building at Brighton road and Beech avenue. Bids are due April 13. Joseph W. Hoover, Starr building, Pittsburgh, is architect.

ST. MARYS, PA. — Stackpole Carbon Co., manufacturer of carbon products and lamp filaments, has acquired plant and business of Johnsonburg Radio Tube Co., Johnsonburg, Pa., and plans expansion and improvements. Several one-story factory additions will be built. Cost, including equipment, will be about $65,000.

Michigan

ADRIAN, MICH. — City is completing preliminary plans for construction of sewage disposal plant to cost $100,000. Walter E. Frazier is city engineer.

Illinois

CHICAGO — Ostermoor & Co., Bridgeport, Conn., maker of mattresses, has acquired two story building on south side from Tung-Sol Lamp Co. and will probably remodel and install equipment.

CHICAGO — Simplex Machinery Co., 77 West Washington street, suite 1801, has been incorporated by B. R. Cooper and associates to manufacture and distribute machinery, machine parts and supplies. Jess S. Raban, 77 West Washington street, is correspondent.

Alabama

BAY MINETTE, ALA.—Baldwin County Electric Membership Corp. has been allotted $200,000 for construction of 211 miles of rural electric lines in Baldwin and Monroe counties.

BIRMINGHAM, ALA. — City has applied to PWA for $150,000 loan to purchase supplies for completion of industrial water supply system.

BIRMINGHAM, ALA. — Magic City Brewing Co. Inc., 803 Comer building, plans erection of brewing plant on 5-acre site recently acquired. Plant will have annual capacity of about 75,000 barrels.

FORT PAYNE, ALA.—Shugart Hosiery Mills Inc., recently formed by W. Y. Shugart and associates, is installing machinery at its plant in North Fort Payne.

LAFAYETTE, ALA.—City voted in favor of issuing $32,000 bonds to finance construction of waterworks system.

LEEDS, ALA.—L. Shapiro, Nashville, Tenn., has acquired plant of Dixie Metal Products Co., here, and plans extensive improvements.

MONTGOMERY, ALA.—Fisher Brewing Co. has acquired site for erection of brewery estimated to cost $500,000.

MOULTON, ALA.—City voted in favor of $20,000 bond issue to finance construction of waterworks system.

Maryland

BALTIMORE—National Can Co. will erect $150,000 factory building, 50 x 186 feet. Brown & Mathews Inc., 122 East Forty-second street, New York, is general contractor.

BALTIMORE—Rustless Iron & Steel Co., 1001 Edison Highway, is receiving bids for extensive plant improvements. H. A. Brassers & Co., 310 South Michigan avenue, Chicago, are engineers.

BALTIMORE — Bohn Refrigerator Co., formerly located in St. Paul, Minn., is equipping plant on Haven street in the Highlandtown area, to take over operations of the C. Hoffberger Co., 409 Aisquith street, manufacturer of refrigerators.

BRUNSWICK, MD. — Town has authorization from governor and legislature to borrow $45,000 to finance construction of sewer system.

CHESAPEAKE CITY, MD.—City will hold election soon to vote on $60,000 waterworks and sewer bonds. J. B. McCrary Corp., 705 Rosenburg building, Roanoke, Va., is engineer. PWA project.

HAGERSTOWN, MD.—Pangborn Corp. maker of blast-cleaning and dust collecting equipment, is making extensive additions to its plant.

District of Columbia

WASHINGTON — Office of general purchasing officer, Panama Canal, will receive bids until April 20 for miscellaneous quantities of galvanized corrugated roofing, steel, copper, brass, cast iron pipe, fittings, etc., schedule 3240, for delivery either Cristobal or Balboa, Canal Zone.

WASHINGTON — Procurement division, treasury department, federal warehouse, will take bids until April 14 for one ½-yard power shovel, gasoline motor powered, invitation 222-3148-a-4-14, for delivery E. R. Lloyd, Louisville, Miss.; various quantities and sizes of drills and taps, invitation 8328-SP-4-14, for delivery St. Louis, Mo.; until April 15 for water treatment plant equipment, including sand filter, chemical feeder, flow meter, invitation RA-3160-D-4-14, for delivery Trussville, Ala. H. E. Collins is assistant director.

WASHINGTON — Bureau of supplies and accounts, navy department, will receive bids until April 13 for 298,000 pounds of nickel bar steel, schedule 335, for delivery Boston, Mass.; miscellaneous water tube boilers with spare parts and tools, schedule 375, for delivery Chicago, Ill.; until April 16 for one motor-driven engine lathe, schedule 379, for delivery Norfolk, Va.; miscellaneous quantities of sheet steel, schedule 380, for delivery Norfolk; until April 20 for miscellaneous quantities of corrosion-resisting steel, schedule 347, for delivery Philadelphia, Pa., and Mare Island, Calif.; eight testing generators, schedule 354, also for delivery Mare Island; and until April 23, for miscellaneous quantities of main reduction gear, schedule 388, for delivery various east and west coast points.

Georgia

AUGUSTA, GA. — City will vote June 2 on issuing bonds for $985,000 to finance construction of waterworks and sewerage system.

THOMASTON, GA. — Upson county rural electrification association has REA approval for construction of 55 miles rural transmission lines at a cost of $65,000.

Mississippi

CLEVELAND, MISS. — City receives bids April 20 for construction of sewage disposal system. Funds of $70,000 are available. J. B. McCrary Corp., 22 Marietta street building, Atlanta, Ga., is consulting engineer.

GREENVILLE, MISS. — Walcott & Steele Co. will erect storage warehouse on Walthall street. C. D. Walcott is in charge of the project.

HATTIESBURG, MISS. — United States Lumber Co., Scranton, Pa., plans to erect pulp mill along Mississippi Central railroad near here.

North Carolina

CHARLOTTE, N. C. — City receives bids April 16 for furnishing various quantities of cast iron pipe and special iron castings, as part of $1,365,000 waterworks improvement program. J. B. Marshall is city manager.

CHARLOTTE, N. C. — F. H. Ross & Co., 224 West Second street, manufacturer of shirts, will construct warehouse and office building on West Morehead street, 100 x 180 feet. Plans are being prepared by M. R. Marsh, Builders building. Cost is estimated at $40,000.

ROANOKE RAPIDS, N. C. — Albemarle Paper Mfg. Co., Tredegar street, Richmond, Va., has purchased plant of Halifax Paper Co., here, and will improve facilities, increase capacity.

WILMINGTON, N. C. — P. & F. Motor Express Co. is rebuilding warehouse damaged by fire recently. F. L. Formydival is in charge of the work.

South Carolina

COLUMBIA, S. C. — South Carolina Electric Co. is constructing 57-mile transmission line from Columbia to Bowman and 23-mile line from Batesburg to Trenton.

PACOLET, S. C. — Pacolet Mfg. Co., Spartanburg, S. C., is replacing machinery in its plant here and plans construction of additional improvements later as part of a two-year program. D. W. Anderson, Spartanburg, is treasurer.

Tennessee

CHATTANOOGA, TENN. — Colonial Coverlet Co., 74 Worth street, New York, leased former property of Browning Hosiery Mill Co. on Central avenue at Twelfth street, and plans to install machinery, improve plant.

JACKSON, TENN. — City voted in favor of bond issue of $399,000 for con-

(*Please turn to Page* 126)

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(*Concluded from Page* 124)
struction of electric distribution system.

TRENTON, TENN. — Gibson County Electric Membership Corp. plans construction of about 131 miles of transmission lines in Gibson, Dyer and Obion counties. REA has granted $143,000 loan for the construction.

West Virginia

MOOREFIELD, W. VA. — Hardy county light and power association applied to REA for funds to construct 163-mile transmission line at an estimated cost of $172,000.

Virginia

GROTTOES, VA. — Duplan Silk Co., 1450 Broadway, New York, plans construction of rayon plant on Rockingham-Augusta line near here.

KEYSVILLE, VA. — City approved issue of $22,000 bonds to finance construction of sewerage system. J. B. McCrary Co., 22 Marietta street building, Atlanta, Ga., is engineer.

RICHMOND, VA. — Smith-Moore Vehicle Co., 408 North Fifth street, will erect factory at Roberts street and Brook road, at an estimated cost of $40,000.

RICHMOND, VA. — Southside co-operative has been authorized by State corporation commission to borrow $110,000 from REA for construction of 120 miles rural lines in portions of Amelia, Brunswick, Dinwiddie, Lunnenburg and Nottaway counties.

Missouri

COLUMBIA, MO.—Boone county rural electric co-operative association receives bids about April 15 for construction of rural electric distribution system approximately 100 miles in length. P. H. Henderson is president; Baumes-McDevitt Co., Railway Exchange building, is engineer.

Arkansas

VAN BUREN, ARK.—Arkansas Smelting Co. has been incorporated here, by B. H. Jacobs and John Campbell, both of Joplin, Mo., with capital of $10,000.

Oklahoma

DEWEY, OKLA. — City voted in favor of issuing $36,000 bonds to finance construction of waterworks system.

FAIRFAX, OKLA. — City voted bonds for filtration plant estimated to cost $16,000. V. V. Long & Co., Colcord building, Oklahoma City, are engineers.

Texas

AMNONA, TEX. — City receives bids April 17 for construction of water supply line, pump house and filter plant. Municipal Engineering Co., 2906 Maple avenue, Dallas, Tex., is consulting engineer.

COLEMAN, TEX. — City votes April 12 on $135,000 bonds to finance construction of sewer system.

DALLAS, TEX. — Western States Grocery Co., 4929 Beeman street has permit for construction of warehouse estimated to cost $121,000.

DENTON, TEX.—Denton County Rural Electric Co. has been incorporated here by Gus H. Egan and W. C. Moss.

GROESBECK, TEX.—Limestone County Co-operative Electric Co., has $250,000 for transmission line construction in Limestone and Falls counties. Will receive bids about May 15. William G. Morrison, 204 Professional building, Waco, is engineer.

HOUSTON, TEX. — City voted $100,000 for rehabilitation and construction of incinerators.

HOUSTON, TEX. — Warehouse and factory of E. A. Hudson Furniture Co., 1905 Winter street, was damaged by fire recently.

HOUSTON, TEX. — City will receive bids April 14 for construction of St. Bernard sewage lift station. R. H. Fonville is mayor.

HOUSTON, TEX. — Reed Roller Bit Co., maker of oil well equipment, has plans for shops, storage and distribution plants in various parts of the state. Also plans construction of one-story factory for production of plug valves. Total cost will be about $700,000.

HOUSTON, TEX. — Standco Oil Tools Co., 1206 Rothwell, has acquired building at Hill street and Clinton drive. Will erect one-story office and install machinery for manufacture of bolts. The name will be changed to Standco Bolt Co.

TYLER, TEX. — Tyler Machinery & Supply Co. Inc., has been organized by J. S. Gentry and S. P. Burke, with capital at $20,000.

WASCOM, TEX. — City voted in favor of $60,000 bond issue to finance construction of sewer and water system improvement.

Wisconsin

CLINTONVILLE, WIS. — Four Wheel Drive Auto Co., 109 East Twelfth street, has set aside $100,000 for purchase of new production equipment at main works here and at Canadian factory, Kitchener, Ont., including gear cutters, lathes, milling machines, etc. Walter A. Olen is president.

MILWAUKEE — Linde Air Products Co., 30 East Forty-second street, New York, will enlarge its local branch at 4251 West National avenue. Work includes plant addition, 30 x 100 feet, to be ready by July 1. L. G. Hubbell is superintendent of construction.

MILWAUKEE — Seaman Body Corp., 3880 North Richards, unit of Nash Motors Co., Kenosha, Wis., will build 71 x 100-foot addition to steel storage building and will extend craneway. Cost will be about $50,000 including equipment.

RACINE, WIS. — Wisconsin Gas & Electric Co. has placed contract with United Gas & Improvement Co. for vertical oven type coal gas plant. Cost is estimated at $450,000. R. E. Moody is general manager.

RACINE, WIS. — Twin Disc Clutch Co. has completed branch factory at Rockford, Ill., representing investment of $150,000 in buildings and equipment, and will devote it exclusively to manufacturing tractor clutches.

South Dakota

BERESFORD, S. DAK. — City approved bond issue of $30,000 at recent election for construction of improvements to power plant, including purchase of 500-horsepower engine unit and switchboard. Total cost of improvements is estimated at $55,000.

DUPREE, S. DAK. — City is forming plans for construction of waterworks and sewer system, including 50,000-gallon tank, at an estimated cost of $60,000. Will ask WPA aid.

ELK POINT, S. DAK. — Union County Rural Power Co. is taking bids for construction of 107 miles power lines in Union county. Buell & Winter Engineering Co., Insurance Exchange building, Sioux City, Iowa, is consulting engineer. (Noted March 22).

Iowa

IDA GROVE, IOWA — Ida county rural electrification association has completed plans for construction of 82 miles rural transmission lines at a cost of $100,000. Earl Graham is chairman; J. K. Burns, Sioux City, is engineer.

Nebraska

CLAY CENTER, NEBR. — Clay county rural public power district has plans approved by state engineer for construction of 408 miles rural transmission lines in Clay county. O. R. Toman, 510 Barkley building Lincoln, Nebr., is engineer. Cost is estimated at about $480,000.

HOLDREGE, NEBR. — City plans improvements to municipal power plant, including installation of 800-kilowatt diesel generator. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

STAMFORD, NEBR. — Beaver-Sappa public power and irrigation district has plans approved by state engineer for construction of 50 miles of rural transmission lines in Furnas and Harlan counties W. R. Martin, Stamford, is engineer.

YORK, NEBR. — Iowa-Nebraska Light & Power Co. plans to remodel power plant and install two 1000-horsepower generators. Cost is estimated at $100,000.

Montana

HELENA, MONT. — Steffeck Equipment Co. has been incorporated by A. J. Steffeck and associates, to deal in road machinery and equipment.

TROY, MONT. — Grouse Mining & Milling Co. plans installation of 20-ton pilot mill on company properties near here. C. H. Barkdull is manager.

Pacific Coast

ALHAMBRA, CALIF. — Hollywood Steel Trailer Co. has opened a new plant here, to manufacture auto trailers. A. W. Alexander is president.

LOS ANGELES — National Tank & Mfg. Co., 8201 Santa Fe street, is erecting factory building, 43 x 73 feet, at an estimated cost of $1935.

LOS ANGELES—Aero Industries Technical Institute Inc. has plans completed for construction of shop and office building at 5221 San Fernando road, estimated to cost $11,000.

LOS ANGELES — Pacific Screw Products Corp., 7422 Compton avenue, has awarded contract for construction of 1-story factory building adjoining its present plant, to Charles Gale, 3458 Centinela street. H. Sage Webster, 517 North La Brea avenue, is architect.

EAST SOUND, WASH. — Orcas Electric Association has been incorporated by Charles S. Girard and associates.

MONTESANO, WASH. — Port commission is considering construction of a cold storage plant.

OPPORTUNITY, WASH.—Brown Metal Works, formerly of Spokane, has moved its plant here under the name of Brown Industries Inc.

SEATTLE, WASH. — I. F. Laucks Inc., chemist and paint manufacturer, is building $10,000 addition to its grinding and mixing plant at 5417 East Marginal way,